THE IRON TRADE REVIEW

VOLUME XXXV CLEVELAND, OHIO, NOVEMBER 27, 1902. NUMBER 48

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade gives evidence that the end of the year is approaching. In no line has there been any significant development in the past week, apart from the consolidation of two Western Pennsylvania steel companies that have been regarded as among the important new competition that the regime of consolidation has produced. As producers of wire and other of the lighter finished products the Sharon and Union companies belong to the branch of the trade in which the pressure of new capacity has been most marked recently. Their merger, while it means a stronger company for offence and defense, also tends toward greater stability in the lines of their greatest output, while the new company is important enough to suggest the possibilities of further consolidation that would add rails, plates and structural material to the combined output. Fuel has continued the dominant feature of the market in the past week. Coke requirements of blast furnaces and foundries have been covered in large amounts, chiefly on the basis of $4 at Connellsville ovens for blast furnace coke and $4.50 to $5 for foundry coke for the first half of 1903. With not a few foundries, the question of coke for the early months of 1903 is still a problem, with the certainty that whatever the new source of supply, in view of the withdrawal of Frick coke from the market, it will be at such an advance as must be represented in higher prices for castings, no matter what the melting ratio. The pig iron market has been quiet, the chief interest being in iron for delivery in the first half of 1903. In the East buyers that have been waiting in expectation of lower prices came into the market for a considerable tonnage. The Southern iron available for this period must come largely from furnaces started in recent months. The principal companies are so heavily oversold that they will have but little iron to offer for any part of next year. Quotations are lower for next year, $20, $19 and $18 for No. 2 foundry Birmingham being named, the lowest price for second half of next year, and the highest for first quarter. In Bessemer iron the principal factor is importations, which have been larger of late, one Pittsburg District buyer having 50,000 tons under contract to arrive in the next few months. English advices are that but for buying of East Coast Bessemer pig for American account the market there is duller and weaker and any expectation of improvement is based on increasing demand from the United States for foundry iron. The steel market is dull, with $29.50 at Central Western mill as the basis for Bessemer billets, and on open-hearth steel $30 to $31 for billets and $31.50 to $32 for sheet bars. The shut down of the Sharon plant has somewhat curtailed the supply of open-hearth billets, while steel makers themselves have been buyers of late. Finished material markets are unchanged. The irregularities in bar iron prices continue. While 1.80c Pittsburg has been officially reaffirmed, sales have been made as low as 1.70c, and in Western markets as low as 1.70c Chicago is reported. In rails some good business has been done and St. Louis, Chicago and Pittsburg report sales which represent about 75,000 tons in the aggregate. The railroads are still the backbone of the situation and they have not yet shown a sign of halting demand. Increased freight rates are a factor with which the entire iron trade must reckon beginning with the new year.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Nov. 26.

Prodigious efforts have been made by the railroads in this district during the past week to relieve the freight congestion and much has been done. Coke shipments during the past few days have been much better than for some time and many furnaces that were idle the greater portion of last week have been able to resume. How long the railroads will be able to keep up this movement of freight is the question which troubles the furnace operators, as they believe that the congestion relieved during the past few days will recur and will be more severe as soon as the first cold snap sets in. A conservative estimate of the loss in pig iron production on the part of the furnaces in the two Valleys on account of the non-delivery of coke up to the present time is 500,000 tons. The merchant furnaces are almost uniformly three months behind in their shipments, and the operators believe that they cannot possibly catch up on their deliveries before July next year. Owing to the accumulated stocks of finished material in all of the yards of the big steel companies in this district, the shipments this week have been very heavy, but the railroads thus far have handled the freight remarkably well.

An advance in freight rates is sure to come about the first of the year, which will further add to the cost of producing iron and steel products and will have a tendency to hold the market where it is at present in nearly all lines. The increase in the tariffs on iron and steel shipments from abroad has already gone into effect amounting to a uniform advance of about 6 percent, which further advances the cost of this foreign material to the consumers. Large deliveries of foreign Bessemer iron have been made to steel producers in this district during the past week, one concern having 50,000 tons purchased that will be delivered during the next four or five months. This iron is being used successfully, despite its high percentage of silicon, as it is mixed with the product of local furnaces to reduce the silicon.

The consolidation of the Sharon and Union Steel companies is looked upon with favor by the trade and it is believed will lend greater stability to the wire and wire nail market. Both are heavy producers of these products, in fact their combined output is second only to that of the American Steel & Wire Co. Thus far the Sharon Steel Co. has not been a factor in the sheet trade, as its fourteen mills will not be placed in operation until after the first of the year. Inasmuch as the output of the company's twenty tin mills is taken by the American Tin Plate Co., the latter has not suffered any competition from these mills.

While the demand for Bessemer and open-hearth billets continues to be only moderate the price of the former is still $29 to $30 for prompt delivery and the latter is selling at $31, for ordinary specifications in small lots. The demand for the lighter gauges of sheets has not increased to any marked extent, but the good buying of the heavier sizes is tiding over many of the mills, owing to the crowded condition of the plate mills. The cutting of the price of bar iron by many of the smaller mills brought about a meeting of the bar iron manufacturers' association this week and they again reaffirmed

the price of 1.80c. As not all of the bar mills of the country are in the association it is certain that this price will be shaded to some extent. Meetings of the plate and structural steel manufacturers will be held next month. The former will meet to renew their annual agreement, and owing to the stability of the structural market no change in ruling prices will be made. No change in agreed quotations will be made by the plate manufacturers, as no difficulty is experienced in securing these prices on extended contracts and premiums of from $5 to $8 per ton on orders for small lots for early delivery.

PIG IRON.—There has been little buying in the week, consumers being mainly concerned in securing deliveries of iron already ordered. We note the sale of 1,000 tons of Northern No. 2 iron, for delivery the first half of next year at $23.50, and 500 tons of English No. 2 at $24 for delivery the remainder of the year. The sale of 1,000 tons of forge iron for delivery the next three months at $21.50, Pittsburg, has also been reported. Small lots of Bessemer iron for prompt delivery are being sold at prices ranging from $23.50 to $24.50 at the Valley furnace, while quotations on Bessemer for delivery the first half of next year are made at $21.50 at the furnace. We make the following quotations:

Bessemer, Valley	$21 50 to 22 00
Bessemer, Pittsburg	22 25 to 22 75
No. 1 Foundry	24 00 to 24 50
No. 2 Foundry	23 60 to 23 50
Gray Forge, Pittsburg	21 00 to 21 50
Chilled Basic, Valley	21 00 to 21 50
Chilled Basic, Pittsburg	21 75 to 22 25

STEEL.—Bessemer billets for delivery the remainder of the year are held at $29 to $30, while for delivery after the first of the year, $28 is asked. Foreign billets cannot compete at these prices, inasmuch as steel sold at present cannot be brought in until after the first of the year. German steel is quoted at $29.25 to $29.50. Open-hearth billets are held at $31 for ordinary specifications, while higher carbons are held at an advance, as high as $37 being paid for extremely high carbon billets. Bessemer rods are held at $35 to $35.50, according to delivery.

FERRO-MANGANESE.—There has been considerable selling of manganese during the past week for extended delivery at $50 for 80 percent. German ferro is quoted at $51.25 to $51.50.

SPELTER.—The market is weaker and prime Western grades are held at 5.08½c to 5.10c, Pittsburg, in carload lots.

MUCK BAR.—The market is reported much weaker and neutral muck bars are quoted $33.50 to $34. Considerable Eastern iron is being offered in this market at $33.

SKELP.—The market is reported steady and iron is held at 1.95c for grooved and sheared is held at 2.05c to 2.10c. Steel skelp is held at 2c to 2.05c for sheared and 2.05c to 2.10c for grooved.

RAILS AND TRACK MATERIAL.—There are inquiries out for fully 50,000 tons of rails which will be placed during the next few days. The demand for light rails continues strong and quotations high. We quote as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $44; 12 pounds, $43; 16 pounds, $41; 20 pounds, $40; 25 to 40 pounds, $38 to $39. Track materials: Spikes, 2.15c to 2.25c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

PLATES.—A meeting of the steel plate manufacturers will be held in New York next month, but no change in agreed quotations is anticipated. For small lots, prompt shipment, local mills are securing as high as 2c. Small lots for future delivery command 1.85c, while large orders for extended deliveries can be placed at agreed quotations, which are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.75c; marine, ordinary fire-box, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive fire-box, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

STRUCTURAL MATERIAL.—The annual meeting of the structural material manufacturers will be held next month. The agreement will be renewed and present prices will without doubt be continued. Considerable new business is being placed. For prompt delivery from 1.85c to 2c is asked, while on extended contracts the following agreed quotations maintain: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

BARS.—A meeting of the bar iron manufacturers was held this week and the present base of 1.80c was reaffirmed. A number of mills are outside of the association and it is to be expected, in view of the recent state of the market and the price of steel bars, that concessions from this base will continue to be made. We make the following quotations: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

PIPES AND TUBES.—The amount of new business that continues to be placed in merchant pipe continues very heavy, and is much larger than it was at this time last year. Quotations in carload lots, plus freight to destination, are as follows:

MERCHANT PIPE.

	Steel		Guaranteed Wrought Iron	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	73	63	70	60
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	69	57	65	54
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	70	58	66	55
Extra Strong Plain End				
⅛ to 8 inch	69	59	65	55
Threads only—Same as Plain End, plus 1¼ percent net.				
Threads and Couplings—Same as Plain End, plus 2½ percent net.				
Double Extra Strong Plain End				
½ to 8 inch	61	51	57	47
Threads only—Same as Plain End, plus 2 percent net.				
Threads and Couplings—Same as Plain End, plus 3 percent net.				

NOTE: Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3½ to 4 inches	60
4¼ to 12½ inches	63

SHEETS.—The American Sheet Steel Co. has not yet announced to the trade what prices will be maintained after Dec. 1. In all probability present quotations will continue, however, as the amount of new business that is being placed in light sheets is not what was expected under the recent reductions. We quote on 500 bundle lots: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.60c; No. 18, 2.85c; No. 26, 3.35c; No. 27, 3.60c; No. 28, 3.85c; No. 29, 4.35c; No. 30, 4.50c.

WIRE AND WIRE NAILS.—That there will be less cutting in wire products hereafter is assured on account of the recent consolidation of the two largest independent manufacturers in the country. The demand for wire nails is fair, but this cannot be said of barb wire. We quote: Wire nails, carload lots, f. o. b. cars, Pittsburg, $1.85 to $1.90; less than carload lots, $1.95 to $2; plain wire, carload lots, $1.75 to $1.80; less than carload lots, $1.85 to $1.90; barb wire, carload lots, $2.15 to $2.20; less than carload lots, $2.25 to $2.30; staples, carload

lots, $2.05, and less than carload lots, $2.15. Galvanizing, 30 cents extra. Cut nails are quoted as follows: Carload lots, $2.05, and less than carload lots, $2.10 f. o. b. Pittsburg, plus freight to point of destination, terms, 60 days, less 2 percent off in 10 days.

MERCHANT STEEL.—The demand continues fair in all lines, especially shafting. Turned cold rolled and ground shafting is held at 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

OLD MATERIAL.—The market continues quiet, although a number of the smaller mills are making inquiry for large lots for delivery next year. Our quotations, gross tons, are as follows: Heavy melting stock, $21 to $21.25; low phosphorous melting stock, $24 to $24.50; steel rails, $21 to $21.25; rerolling rails, $22.50 to $23; No. 1 cast scrap, $18.50 to $19; borings and turnings, $11 to $11.50; busheling scrap, $16 to $16.50; old iron rails, $24.50 to $25.

COKE.—Foundry coke for prompt shipment has again advanced slightly and dealers and manufacturers are asking $8 and $9 per ton for prompt deliveries. A number of the plants in the Connellsville region have been compelled to shut down owing to the congested condition of their yards, but it is believed that many will resume this week. For the week ending Saturday, November 11, the production of the Connellsville region amounted to 238,635 tons, a falling off of 8,675 tons over the previous week. The production of the lower region amounted to 48,004 tons. Foundry coke for delivery next year is now sold at $4.50 to $5 at the ovens, and furnace coke at $4 to $4.25 per ton.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, NOV. 25.

Except in one or two lines of finished steel, there is a marked absence of activity. This market is in such an unsettled state and prices are so irregular that not only do consumers feel little inclination to buy, but some sellers have little desire to sell. Deliveries are in such shape that unless the material is in stock or on track, neither party to a transaction has any positive assurance that it will be shipped on the date specified. Neither mills nor furnaces can guarantee any delivery under the present conditions, and so long as the railroads continue to be short of cars and locomotives, this state of affairs is expected to continue. The lack of rolling stock, to which is due the fuel famine, will compel every furnace in the West and Southwest to carry over into next year large tonnages which should have been delivered this year. The extent of this may be better imagined from the report of one company in the South whose undelivered tonnage on the first of this month amounted to over 160,000 tons. Another company in the same section has a stock of 10,000 tons of pig iron in its yards waiting for cars. Manufacturers of finished steel unable to get pig iron are also losing time on their orders, and there will have to be heavy importations of both crude and finished iron and steel in the coming year to meet the largely increased wants of the country. Dealers in foreign material report a good inquiry for steel, an order having been placed during the past week for 5,000 tons of German basic Bessemer billets for delivery in December and January, the price being $27 seaboard, duty paid.

There has been a good demand in the week under review for plates, sheets, merchant pipe and tubes, mills booking large tonnages for each material. The buying of standard rails and structural steel appears to have spent itself, due probably to the fact that manufacturers are sold up for ten or eleven months in the coming year. Pig iron is weak and there is little buying for future shipment. There are no changes in the prices for next year, though quotations on iron for spot shipment are 50 cents to 75 cents a ton less than a week ago. Scrap shows no improvement, and in the downward tendency of prices to which it is tending the bottom has not yet been reached. Bar iron continues to be weak, prices being very irregular. There has been heavy buying of coke in the last two weeks, orders having been placed with Connellsville and West Virginia ovens aggregating several hundred thousand tons, the price ranging for foundry coke from $4.50 to $5 at the ovens.

PIG IRON.—With the approach of the holiday season, there is beginning to be felt the usual end of the year lull in trading. It is not unwelcome to sellers, and brief though it may be, it will give the market an opportunity to subside to a more normal level. The present condition, with its widely varying prices, is not a healthy one, and almost without exception manufacturers would be glad to see a general lowering of values. So long as the fuel famine and car shortage continue, however, it is not expected that iron for the early part of next year will be less than $20 Birmingham for No. 2 foundry. There has been little buying during the week for the last half of 1903, though a more active demand has been felt for the second quarter. Foundrymen, as a general rule, while sounding the market freely for deliveries commencing with July, show no haste in placing contracts, the wide range of prices for this delivery, from $18 to $20, inclining them to the belief that still lower prices might prevail later on. The demand for spot iron has fallen off considerably during the week, and No. 2 foundry is being offered this week at from $25.65 to $26.15. This gives no assurance that the market will remain weak, as recent history has shown that when spot iron has dropped 50 cents a ton, it has regained its old position, and sometimes advanced beyond it, the following week. The present weakness is due in a great measure to the fact that Southern furnaces have been making good deliveries on their contracts, but the condition of the railroads gives no promise that this will continue. One Southern furnace company has 10,000 tons of iron stocked in its yards because of the scarcity of cars, while another company in the same section has been thrown behind in its deliveries to the extent of 160,000 tons from causes arising out of the car famine. Several furnaces in the West are still banked or blown out for want of fuel, and all of them will carry over into the coming year heavy tonnages booked for delivery this year. There are several large inquiries in the market for shipment between January and June, one for 20,000 tons of gray forge iron from a local interest, but none of them has been placed of yet. We quote for delivery in the first half as follows:

Lake Superior Charcoal	$26 00 to 27 00
Local Coke Foundry No. 1	23 50 to 24 00
Local Coke Foundry No. 2	23 00 to 23 50
Local Coke Foundry No. 3	22 50 to 23 00
Local Scotch Foundry No. 1	24 00 to 24 50
Local Scotch Foundry No. 2	23 50 to 24 00
Southern Coke No. 1	24 65 to 25 15
Southern Coke No. 2	24 15 to 24 65
Southern Coke No. 3	23 65 to 24 15
Southern Coke No. 4	23 15 to 23 65
Southern No. 1, soft	24 65 to 25 15
Southern No. 2, soft	24 15 to 24 65
Southern Gray Forge	22 15 to 22 65
Southern Silveries	26 65 to 27 15
Jackson Co. Silveries	31 00 to 32 00
Ohio Strong Softeners	26 10 to 27 10
Alabama Car Wheel	27 15 to 27 65
Malleable Bessemer	25 00 to 26 00

BAR IRON.—There has been an increased demand for iron on the part of railroads and car builders, as a result of the large orders that have been placed for rolling stock. The general demand, however, is below normal, and prices are somewhat irregular. Specifications are up to the average of recent weeks, and are for mixed light and heavy sizes. We quote mill shipments, Chicago delivery, Bessemer steel, 1.75c to 1.85c; angles less than 3x3, 1.85c to 1.95c base; iron, 1.80c to 1.90c; hoops, 2.15c. Prices on stock from store, steel, 2c to 2.10c; iron, 2.15c to 2.20c; hoops, 2.40c to 2.50c; angles, 2.50c to 2.60c.

SHEETS.—While the demand is not what might be called active, it is good and indicates a healthy condition of trade among consumers. Independent products are making strong efforts to secure orders, and there is some irregularity in prices. We quote No. 27 black, 2.80c to 2.90c; galvanized, 3.75c to 3.85c; for delivery from stock, No. 27 black, 3.05c to 3.10c; galvanized, 75 percent to 75 and 5 percent.

STRUCTURAL STEEL.—All the large producers are sold so far ahead that promoters of new building enterprises, of which there are many in this city, find little encouragement to go ahead with their structures, not being able to get any promise of delivery of material before winter of next year. This, together with the fact that large jobbers have covered for their

needs, has resulted in a quiet market. Specifications are numerous, mills being delayed in shipments. We quote mill prices, Chicago indefinite delivery, as follows: Beams, 15 inches and under, 1.75c to 1.85c; 18 inches and over, 1.85c to 2c; universal plates, 1.75c to 2c; angles, channels and tees, smaller than 3 inches, 1.85c to 2c base. For prompt shipment from mills, prices are 40 cents higher on carload lots than above. On lots from store, we quote 2½ to 3½ cents per pound.

BILLETS.—There is a good demand for both domestic and foreign billets, and the sales of the week include 5,000 tons of German basic Bessemer billets for Eastern delivery, December to January, at $27 seaboard, duty paid. We quote domestic open-hearth billets, $38 to $40, according to quantity and delivery; foreign forging billets in large lots, $36 to $37.

RAILS AND TRACK SUPPLIES.—Demand for heavy rails is active, among the several inquiries in the market being one for 9,000 tons. There has also been active buying of light rails and track supplies. We quote standard sections, $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes; light rails out of store, $45 to $50. Track supplies, mill shipment, are quoted as follows: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c; second quality, 2.15c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.15c, with usual differentials for other sizes.

MERCHANT PIPE AND BOILER TUBES.—There is a good demand for both materials, many jobbers and consumers putting in large stocks for the coming season. We quote f. o. b. Chicago:

Less than carload lots, 12½ percent net advance.

MERCHANT PIPE, RANDOM LENGTHS.

	Black. Percent.	Galv. Percent.
⅛ to ¾-in., inclusive	66½ net	56½ net
½-in.	68½ net	58½ net
¾ to 6-in., inclusive	73½ net	63½ net
7 to 12-in., inclusive	71½ net	61½ net

BOILER TUBES.

Steel.

	Percent.
1 to 1½ in.	43½
1¾ to 2½ in.	56
2¾ to 5 in.	61
6 to 13 in.	56

Iron.

	Percent.
1 to 1½ in.	38
1¾ to 2½ in.	36
2¾ to 5 in.	46
6 inches and larger	36

CAST IRON PIPE.—Buying is limited to small lots. Manufacturers do not expect any revival of trade before spring. We quote f. o. b. Chicago, 4-inch water pipe, $37; 6-inch, $36; 8-inch and upwards, $35; gas pipe $1 a ton higher.

PLATES.—There is an active inquiry, and sales during the past week aggregate 12,000 to 15,000 tons. Mills are sold up to nearly June of next year. We quote mill prices, Chicago delivery, future shipments: Tank steel, ¼ inch and heavier, 1.75c to 2.10c; flange steel, 1.85c to 2.20c; from stock, tank steel, ¼ inch and heavier, 2.25c to 2.40c; 3-16, 2.35c to 2.50c; No. 8, 2.40c to 2.60c; flange steel, 2.50c to 2.65c.

MERCHANT STEEL.—Mills report little new business, not being in a position to handle more owing to their crowded condition. Specifications are active. Toe calk has advanced $1 a ton during the week under review. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent higher; cold rolled shafting, carload lots, 47 percent off, Chicago; less than carload lots, 42 percent off, Chicago.

WIRE PRODUCTS.—There is a good demand for all kinds of farming material, and the output of mills goes into immediate consumption. We quote prices to jobbers, carload lots, Chicago delivery, as follows: Smooth wire annealed, 1.90c; galvanized, 2.20c; painted barb wire, 2.30c; galvanized barb wire, 2.60c; wire nails, $2; cut nails, 2.20c; polished staples, 2.15c; galvanized staples, 2.45c. Prices to retailers are 5 cents higher than above quotations on carload orders, and 15 cents higher on less than carload orders.

COKE.—There has been active buying of Connellsville coke during the week, several hundred thousand tons having been placed by foundries and independent furnace interests. Connellsville coke for future delivery is being quoted in this market at $4.50 to $5, at ovens; for spot delivery, $9 to $11. West Virginia coke for future shipment is about 25 cents a ton less.

OLD MATERIAL.—Little buying has been done during the past week, and prices are being depressed downward. Demand for cast scrap of all kinds continues to be active, though it is not as brisk as it was several weeks ago. The scrap market is beginning to feel more keenly than it has for several months the conditions that affect the demand for finished material. We quote gross tons, as follows:

The following are selling prices per net ton:

Old Iron Rails	$24 50 to 25 00
Old Steel Rails (mixed lengths)	18 00 to 18 50
Old Steel Rails (long lengths)	23 00 to 23 50
Relaying rails	31 50 to 32 00
Old wheels	22 50 to 23 00
Heavy melting steel	16 50 to 17 00
Mixed country steel	15 00 to 15 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$19 50 to 20 00
No. 2 R. R. wrought	18 00 to 18 50
Shafting	19 50 to 20 00
Dealers' forge	16 00 to 16 50
No. 1 busheling	14 00 to 14 50
No. 1 Cast	16 50 to 17 00
Railway malleable	16 00 to 16 50
Country malleable	14 50 to 15 00
Iron axles	23 50 to 24 00
Steel axles	19 50 to 20 00
Cast borings	10 50 to 11 00
Wrought turnings	13 50 to 14 00
Iron axle turnings	14 50 to 15 00
Steel axle turnings	13 00 to 13 50
Stove plates	12 50 to 13 00
Old iron splice bars	21 00 to 21 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Nov. 26.

The market in Cleveland has been unusually dull for a week. This condition is not regarded as especially significant, being due in part to the strike in the light gray iron foundries and in part to a disposition not to contract for business before the turn of the year. There is, however, some significance in the fact that the demand for structural material for buildings is not so strong. The erection of a number of buildings, including a large church and a watch factory, has been indefinitely delayed on account of the high price of materials. While the high price of iron and steel is by no means the only cause for this postponement of construction, it has its influence along with the prices for other materials. Failure to deliver plates is causing delay in shipbuilding and very little work is being done at several of the lake yards.

IRON ORE.—Shippers are doing all they can to clean up odds and ends as the close of the season approaches and a fair amount of ore has been brought down during the week, but dispatch has been exceeding slow. The congestion of freight at Pittsburg has caused increased shortage of cars in Cleveland and other Ohio ports and some of the big vessels have been compelled to wait 10 days before they could be unloaded. The prevailing rates are still 80 cents from Duluth and 70 cents from Marquette and Escanaba, although occasionally 85 cents is paid from Duluth and 75 cents from Escanaba to Buffalo. There seems to be very little prospect that the vesselmen will find the close of the season of 1902 as profitable as the windups of some other years have been.

COKE.—The foundries have not been quite as vigorous in their complaints at offices of sales agents this week. Those in Cleveland that are not affected by the strike have managed to get enough coke to keep going, but in suburban and neighboring towns a number of foundries have not been so fortunate and have been compelled to close. The price for prompt delivery is $9 and $5 for the first half of next year.

PIG IRON.—The market is somewhat easier. No. 2 Southern for spot delivery can now be had at $25.70, Cleveland, and there is a small quantity of No. 1 Northern offered at $27.95 Cleveland. The latter comes from a furnace which had been running for eight months making Bessemer on a contract and will make foundry iron for about six weeks. Very little interest is shown by buyers in the second half of next year—for which prices are on a basis of $22.75 Cleveland for No. 1 foundry, and $21.75 for No. 2. Foreign is selling at the fol-

lowing prices: German, $25.50; Scotch, $24.50 to $25.50; English, No. 2 Middlesboro, $23.50 to $24. We quote domestic as follows for shipment in the first half of 1903:

Bessemer	$21 75 to 22 25
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	23 00 to 23 50
Scotch No. 2	22 50 to 23 00
Gray Forge, Valley	20 50 to 20 75
Lake Superior Charcoal	25 00 to 26 00

FINISHED MATERIAL.—The demand for bar iron is at low ebb. For a number of weeks a persistent effort has been made in certain quarters to show consumers who have been heavy users of bar iron that steel bars will answer their purpose. The result is seen in the firm prices of steel, 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg, which have prevailed, while the price of iron is unsteady. The principal producers are still holding for 1.80c Pittsburg, though 1.75c Pittsburg has been done. Plates are firm and scarce. For tank for delivery within 30 days, the price is from 2c to 2.10c, and for delivery within three to four months about 1.85c can be done. The sheet market is dull, with occasional reports of cutting below the prices of the distributors of the product of the principal producer, which are as follows: For 3-16-inch sheets and heavier, 2.10c to 2.15c, Cleveland. Mill sales of black sheets, Cleveland, to consumers: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.55c to 2.70c; Nos. 18-20, 2.75c to 2.90c; Nos. 22-24, 2.85c to 3c; Nos. 25-26, 2.95c to 3.10c; No. 27, 3.05c to 3.20c; No. 28, 3.15c to 3.30c. On galvanized sheets we quote mill sales in carload lots, Cleveland, as follows: Nos. 10 and 11, 2.60c to 2.75c; Nos. 12-14, 2.70c to 2.85c; Nos. 15-17, 2.80c to 2.95c; Nos. 18-21, 3c to 3.15c; Nos. 22-24, 3.30c to 3.45c; Nos. 25-26, 3.55c to 3.70c; No. 27, 3.80c to 3.95c; No. 28, 4.05c to 4.20c; No. 29, 4.45c to 4.60c; No. 30, 4.95c to 5.10c. Galvanized sheets out of stock are quoted 75 and 2½ off.

OLD MATERIAL.—The market is very dull, but not weak. The exception as to demand in machine cast scrap, of which a considerable number of sales have been made, and the price is about 50 cents per ton higher. We quote Cleveland prices, all gross tons, as follows:

Old iron rails	$25 50 to 26 50
Old steel rails (over 6 feet)	22 00 to 23 00
Old steel rails (6 feet and under)	21 00 to 22 00
Old car wheels	20 00 to 21 00
No. 1 R. R. wrought scrap	20 00 to 21 00
Mill scrap	19 50 to 20 00
No. 1 machine cast scrap	20 50 to 21 00
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	18 50 to 19 50
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	11 00 to 12 00
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	17 00 to 18 00
Grate bars	12 00 to 13 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 00 to 16 00
Malleable iron (railroad)	20 50 to 21 50
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	15 00 to 16 00
Heavy steel	18 50 to 19 50

CINCINNATI.

Nov. 25.

The market the past week has continued quiet. Prices have made no important changes. The coke situation is strong. The demand has been good for quick shipment and for next year's delivery. Spot coke sold mainly at $8.50 to $9 f. o. b. Cincinnati. For next year's delivery contracts for foundry coke are now mainly at $5 cash, ovens. For deliveries in next 30 days, $6 to $7 represents current prices in the various districts. In pig iron, while a quiet tone prevails, prices are maintained. In finished material some further slight concessions have been made. Scrap iron is lower for some descriptions.

PIG IRON.—The dullness which prevailed last week has continued and there was not much business transacted. Interest is more strongly centered in spot iron than in future contracts. This is the result of the increased offerings of spot, and the waiting attitude of buyers toward future business. For the first half of next year No. 2 foundry can be had at $19, Birmingham, although there is still some effort to obtain business at $20 or over. Spot iron is freely offered at varying prices, the most popular figure being $20, Birmingham. The range of quotations is $19.50 to $22 for No. 2 foundry, cash Birmingham. The trading is confined almost exclusively to the higher grades. The lower grades are extremely dull, with prices almost nominal under lack of demand. We quote No. 3 foundry $18.50; No. 4 foundry $16; gray forge $15.50@ $15.75, cash, Birmingham. The freight from Birmingham to Cincinnati is $3.25 per ton. The Southern furnaces are still producing well and deliveries on contracts are better, although the difficulties of the railroads are not abated, and it is just as hard to obtain reasonably prompt movement as it has been in the past.

The temper of the trade on the part of both buyers and sellers is to wait. The fact that no further concessions have been made in prices, in the face of lack of demand, shows that sellers are not inclined to urge their offerings. The buyer holds that nothing will be gained by placing contracts at present. Salesmen are out in the territory calling on their customers, not so much in the hope of selling iron as to learn what they can as to probable requirements next year and to obtain buyers' views. In closing our letter last week we called the market dull but steady, and this probably expresses the situation today. While spot iron is not easily sold, still the aggregate of small orders is taking enough of the available supply to hold values at their present level. We quote for delivery in the first half of next year as follows f. o. b. Cincinnati:

Southern Foundry No. 1	$22 75 to 23 25
Southern Foundry No. 2	22 25 to 23 00
Southern Foundry No. 3	21 25 to 21 75
Southern Foundry No. 4	20 25 to 20 75
Southern Fonudry No. 1, soft	22 75 to 23 25
Southern Foundry No. 2, soft	22 25 to 23 00
Gray Forge	19 00 to 19 25
Northern Foundry No. 1	26 10 to 26 60
Northern Foundry No. 2	25 10 to 26 10
Southern car wheel iron	28 00 to 29 00
Malleable coke iron	25 00 to 25 75

FINISHED MATERIAL.—The demand is rather light and the market easy in tone, with some further slight reductions in prices. The base price for bar iron is lower and in structural retail prices are easier and deliveries are more easily obtainable. A few unimportant changes in sheets we also note. Merchant pipe is quiet and unchanged. Buyers of pipe are now waiting to see what independent mills will do in view of the action of the leading interest. The market is therefore unsettled. Sales of black sheets No. 27 are at 2.75c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.20c; No. 27, 3.10c; No. 16, 2.75c; No. 14, 2.65c; No. 12, 2.55c; No. 10, 2.45c. Galvanized sheets cars lots sell at 75 and 10 percent off; less than car lots, 70 and 10 percent off. Tank plates out of store are quoted at 2.25c for ¼-inch and 2.35c for 3-16-inch. Prices for bar iron in carload lots are: 1.80c base, half extras f. o. b. Cincinnati; steel bars, 1.72c base, half extras f. o. b. Cincinnati. Both are retailed at 2c base, half extras, out of store. Beams and channels are selling at 2½ to 2¾c, retail, and angles at 2.15c@2.25c for base sizes. Merchant pipe and boiler tubes are quoted as follows for carload lots f. o. b. Cincinnati:

MERCHANT PIPE.

(Basing discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜-inch	66.8	56.8	63.8	53.8
½-inch	68.8	58.8	65.8	55.8
¾ to 6-inch, inclusive	73.8	63.8	70.8	60.8
7 to 12-inch, inclusive	71.8	61.8	68.8	58.8

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ in.	43.8 & 5	38.8 & 5
1¾ to 2½ in.	56.3 & 5	36.3 & 5
2¾ to 5 in.	61.3 & 5	46.3 & 5
6 to 13 in.	56.3 & 5	36.3 & 5

OLD MATERIAL.—The market is easy and quotations for most descriptions are lower. We quote:

Old No. 1 Wrought Railroad, net tons	$20 00
Cast Machine and Foundry, net tons	19 00
Old Iron Rails, gross tons	24 50
Old Steel Rails, gross tons	23 00
Old Short Lengths, gross tons	19 00
Old Iron Axles, net tons	25 50
Old Chilled Car Wheels, gross tons	22 00
Stove Plate, net tons	11 75 to 12 00
Wrought Turnings, net tons	14 50
Cast Borings, net tons	12 00

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., NOV. 25.

PIG IRON.—Satisfaction is expressed by sellers over the developments of the local pig iron market during the past week. The chief feature has been the increase in inquiries for 1903 delivery. It would seem as if those who have given their requirements for next year little or no attention, chiefly because of their belief that lower prices would come, now seem ready to do something in this direction. Representatives of all furnaces here have received more inquiries during the past week for the first six months of the next year than they have had for months past. So far as the Southern furnaces are concerned, the inquiries have resulted in positive assurances that they have disposed of their entire output for that period. There may be a furnace here and there of which this cannot be said, but there is no doubt that these will have but little iron to offer. During the past week, Northern furnaces seem to have receded from their recent attitude, and we hear of some good sales being made for 1903 for this market, the most prominent being 2,000 tons of Northern No. 2 X on the basis of $23 at the furnace, delivery from January ore. We know of an offer of $22.75 being made for a good sized quantity of the same grade and for the same delivery, and which will probably be closed in the near future. There have also been some good inquiries for No. 1 X Northern for the first quarter of the new year, which is quoted at about $23.75 at the furnace. But in the main those making provisions for their wants in the early months of next year are looking for their supplies abroad. Foreign irons are in better request at present. Prices, however, are rather irregular. Large lots are obtainable on exceptionally good terms. While some quotations for Middlesboro No. 3, for example, run as high as $19.25, New York delivery, duty paid, we know that cargo lots can be had at better prices, with $18.75 readily possible. As for some weeks past, Scotch irons are less in demand. Prices remain stationery. German irons are more sought for, and shipments are larger than at any time during the present year. Large cargo lots command $20.50, New York delivery, duty paid, with prompt shipment guaranteed. A large part of the foreign irons being contracted for is on the basis of analysis. Ocean freights are improving weekly, and steamers can be chartered more easily now. There are those who expect an easier market for foreign irons to prevail before the advent of the new year.

For the last half of the next year, business is at a standstill. Some of the furnaces are adhering less rigidly to $20 at the furnace for No. 2 Southern, and are making sales at $18.50. All the furnaces report, however, a disinclination on the part of consumers to contract for such a remote time. The coke situation hereabouts still continues to interfere seriously with foundry operations. Local foundrymen, as a general rule, are paying $8 at the ovens for prompt shipment. The expectation is that freight rates on iron and steel will be advanced 10 percent in the next few days. Yesterday traffic agents of the trunk lines met in this city to consider the matter, and the consensus of opinion favored such a step. New York prices for 1903 are as follows: No. 1 X Northern, $23.25 to $24.75; No. 2 X, $22 to $22.75; No. 2 plain, $21 to $21.75; Southern No. 1 foundry, $23.25 to $23.50; No. 2 foundry, $22.25 to $22.50; No. 3 foundry, $21.50 to $22; No. 4 foundry, $20.50 to $21.50.

BILLETS.—It is difficult to obtain a reliable quotation on German steel billets. Our advices are that a shipment of 10,000 tons could be had for $26.50, New York delivery, duty paid. The majority of importers, however, quote $26.75 for lots of 1,000 tons and upward, while a few name $27.

FINISHED IRON AND STEEL.—The structural material market is now conspicuous for the large tonnage being booked for next year. Mill agents here report that the orders cover a wide range of territory, with the Eastern States in the vanguard. The depression in sheets seems to have spent its force, a better tone being observable during the week. The demand, however, is not up to expectations, and this has a tendency to encourage sales at receding prices by small jobbers. The plate situation still remains the bright feature of the finished material market and good orders continue to be booked. In bars, better deliveries of the small sizes form a new feature. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.95c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 2.50c; refined iron bars, 1.95c to 2c; soft steel bars, 1.95c to 2.10c; steel sheets, in carloads, New York, No. 28, black, 3.05c to 3.15c; galvanized, 75 and 7½ off.

PHILADELPHIA.

Nov. 25.

The effects of the suspension of work for six months by 150,000 men employed as miners and by many indirectly affected are being shown now in the congestion of freight, which is having far-reaching influence. It is feared that the strike will cause demoralization of transportation to a considerable extent throughout the winter. While general conditions are perhaps somewhat more satisfactory than they were a week ago, there is still considerable uncertainty.

PIG IRON.—Sales for several weeks have not been large and during the past week the trade has been unusually quiet. Very little domestic iron for this year is obtainable and foreign is being bought when it is a necessity. Prices for next year's deliveries are regarded by buyers as too high and little is being done. The market is depressed by the freight situation. Producers are putting a high price on pig iron because of the high level of fuel cost and the possibility that this may be higher. Anticipated advances in freights are also a factor. Prices are about as follows for deliveries in Philadelphia from now to April: No. 1 X foundry, $25 to $26; No. 2 X foundry, $23 to $24; No. 2 plain, $22.25 to $22.75; gray forge, $21 to $21.50; Middlesbrough, $21 to $22; Scotch, $23 to $24.50.

BILLETS.—There is some inquiry, with foreign steel available at $26.50 to $27, while $30 to $31 is asked for American.

FINISHED MATERIAL.—The scarcity of fuel, which has prevented some of the larger mills from getting out more than half their tonnage, has helped to keep the market in plates strong. Bars are easier with the possibility of lower prices. Structural material brings 2c to 2.25c for this year's shipments, and 1.72c to 1.80c for next year. We quote plates and bars as follows: Plates in small lots, 2.10c to 2.15c; carload lots, ¼-inch and thicker, 2c to 2.05c; universal, 2c to 2.05c; flanges, 2.10c to 2.20c; fire box, 2.25c to 2.30c; marine, 2.30c to 2.35c. Steel bars, 1.80c to 1.85c, prompt shipments from local mills. Western steel, 1.75c to 1.80c. Bar iron is quoted 1.85c to 1.90c for carload lots.

OLD MATERIAL.—Conditions are unsatisfactory and the outlook is for a dull if not a weak market during the remainder of the year. We quote as follows: Old steel rails, $20.50 to $21.50; miscellaneous heavy steel scrap, $20 to $20.50; low phosphorus scrap, $27 to $28; old steel axles, $25 to $26; old iron axles, $28 to $29; old iron rails, $24 to $24.50; old car wheels, $20.50 to $21.50; choice scrap, railroad No. 1 wrought, $22 to $23; country scrap, $20 to $21; machinery cast, $19.50 to $20.50; No. 2 light scrap (forge), $17 to $17.50; No. 2 light scrap (ordinary), $14 to $15; wrought turnings, $16 to $16.50; wrought turnings, choice heavy, $17 to $17.50; cast borings, $10.25 to $10.75; stove plate, $14 to $15.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM NO. 150 NASSAU ST., NOV. 25.

PIG TIN.—The market during the past week was characterized by the heaviest declines that have taken place in several months. Prices show a decline of some 80 points from those which prevailed at this time a week ago, and today's closing prices were the lowest recorded during the week. The weakness in the market is accounted for in many ways, the chief reason being a notable shrinkage in the demand, both for prompt and forward deliveries. Manipulation has also been responsible for the declines. The London market for the week reflected conditions here,

being weak throughout, spot closing today £2 lower than a week ago, due in a large measure to bearish reports emanating from here, principally confined to decreasing consumption. Today's closings at the Metal Exchange were as follows: Spot, 24.40c to 24.70c; November, 24.35c to 24.65c; December, 24c to 24.50c. Today's London closings were: £112 for spot, and £111 5s for futures. Arrivals at Atlantic seaports to date amount to 2,946 tons, with 1,010 tons afloat.

COPPER.—Weakness was the dominant feature of the local copper market during the past week. Buyers are not only holding aloof from the market, but sellers are offering in large blocks. At the Metal Exchange today, the offerings were over 1,000,000 pounds, with no bidders. Decreased consumption and increasing production, with the consequent accumulation of surplus stocks, are the main factors in the receding prices. In London during the week, a declining market was noted, with dealings of the most meagre kind. The closing prices in London today were the lowest which have been reached since the end of January of the present year, being £50 1s 3d for spot, and £50 7s 6d for futures. At the Metal Exchange today, closing prices were as follows: Lake, spot to February, 11.35c to 11.55c; electrolytic and casting, spot to November, 11.25c to 11.35c; December to February, 11c to 11.25c; standard, 10.50c nominal. Exports for the month to date, aggregate 8,890 tons, the normal quantity.

PIG LEAD.—Sales are still being made on the basis of 4.12½c for lots of 50 tons or more. In St. Louis the market continues weak at 3.97½c to 4c. London prices are lower by three shillings than a week ago, being now quoted at £10 13s 9d. There are rumors that the merger of prominent lead interests, which has formed the gossip for several week past, is now reaching completion, but they cannot be confirmed.

SPELTER.—Slightly lower prices were the rule during the week spot declining five points to 5.20c nominal. December is quoted at 5.12½c. The market has been especially weak in St. Louis, values having declined about 15 points. Latest quotations are 4.90c to 5c. The London market advanced 7s and 10d during the week, closing today at £19 17s 6d.

ANTIMONY.—Cookson's has been selling at 9 and 9½c, Hallett's at 7½c and other brands at 7¼c. Demand moderate.

NICKEL.—Unchanged. Prices average 40 to 60c, according to quantity.

QUICKSILVER.—Jobbers only are in the market, and sales have been made on the basis of $48 per flask in lots of 100 flasks. London, £8 15s.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Nov. 25.

There is little strength to the metal market. Buying is dull and prices are weak. We quote jobbers' prices to consumers as follows: Lake copper, carload lots 11¾c to 12c; less than carload lots, 12¼c to 12¾c. Pig tin, 27c; pig lead, carload lots, 4.05c to 4.10c; less than carload lots, 4½c. Sheet zinc, carload lots, 6½c, and 6.65c in lots of 600 pounds. Spelter, carload lots, 5.35c; less than carload lots, 5¾c to 6c. Antimony, 10¾ to 11c for Cookson's and 9¾c for Hallett's in small quantities. Nickel, 50c to 60c, according to size of order and delivery. There is a fair demand for old metals. Selling prices of dealers are as follows: Copper wire, $10.38; heavy copper, $10.38; light copper, $9.38; red brass, $10.50; yellow brass, $8; light brass, $6.50; lead pipe, $3.90; zinc, $3.75.

The location of the structural shop of the Tennessee Coal, Iron & Railroad Co., at Ensley, Ala. being close to the company's rail mill, it became necessary in order to secure more room for tracks, etc., to serve the rail mill to move the shop to another location on contiguous property, and this is now being done. The company also contemplates the establishment of a central power station to supply electricity to the steel plant and blast furnaces. This plant will consist of the present equipment, moved to another location, with some needed additions.

EASTERN PENNSYLVANIA.

(Special Correspondence.)

HARRISBURG, Nov. 25.—Furnaces are starting up on every hand, if they can procure coal, and the mills are making large shipments. Every railroad is tied up with freight and calling for more engines and cars and the Pennsylvania and Reading officials are trying to figure out means to reduce freight congestion. The Pennsylvania within a week has given contracts for about $3,500,000 worth of work. The contracts call for construction of two large classification yards opposite the city, building of 12 miles of double and triple track with bridges and other work as well as shops and other structures and the construction of a stone bridge 2,250 feet long over the Susquehanna. The Pennsylvania will build double the number of locomotives formerly built at its Juniata shops and there may be many others ordered. The Reading hs already ordered 45 from Baldwins. The Pennsylvania will rebuild all of the tracks fronting along the Pennsylvania Steel Works at Steelton.

In this district all branches of the iron and steel industry are in operation more regularly, the coal shortage mentioned in the last letter having been overcome. The Pennsylvania Steel Works, employing over 8,000 men, have resumed in full and the company will blow in No. 4 furnace shortly. Last week records for production were broken in the rail and Bessemer mills, the latter turning out 1,290 tons of steel ingots in 24 hours.

The Eastern Steel Co. is rapidly putting its plant at Pottsville into operating shape. The mills are being overhauled and large engines and boilers are being installed. The Pioneer furnaces will be started and the steel mills fired up very soon. Several high power engines have been ordered in Harrisburg for the electric plant.

The Central Iron & Steel Co., which rolled the steel for the greater part of the East River bridge is about completing a large contract for the North German Lloyd Co.'s new Hoboken piers. The company's mills in this city have broken records for this year's work. The foundations for the six 50-ton open-hearth furnaces are well nigh finished.

Coatesville works have had difficulty to procure fuel for large runs, but it is stated that they will remedy the difficulty by purchase of their own cars to haul coal from the mines. This plan has been adopted by the Pennsylvania, Maryland, Lackawanna, Central and other large steel companies in this section. Phoenixville works had to suspend part of last week because of poor coal supply.

York and Columbia mills have been busy and four furnaces will be in blast in the Columbia district within a week or so.

Robesonia furnaces has been banked again owing to the coke supply failing.

The Carpenter Steel Works are considering extensions to the Reading plant.

Leesport furnace, which was started a few days ago, will produce 300 tons per week hereafter, according to estimates. O. S. Keim is the superintendent.

Plans are being drawn for an enlargement of the works of the Parkesburg Iron Co., at Parkesburg, Lancaster county. The producing capacity will be doubled within a few years.

The old mill of the Harrisburg Nail Works is being dismantled.

The E. & G. Brooke Iron Co. has lighted No. 2 furnace after a long shut-down.

The Exeter Iron Co. will enlarge its Riverside works so as to double its capacity. The furnaces are being rebuilt.

The Pennsylvania railroad will build new shops in this city and greatly enlarge its Altoona shops. The company plans to increase its capacity for making locomotives.

The Tennessee Coal, Iron & Railroad Co. has ordered a 450-h. p. engine for ventilating one of its mines from the Harrisburg Foundry & Machine Works.

Two more furnaces have been started in the Allentown district.

The Chambersburg Engineering Co. has increased its force of men at Chambersburg. It has many contracts ahead.

The Hamilton Watch Co. will enlarge its Lancaster works by building an iron addition for new departments. The addition will employ 250 extra people. A. B. H. Jr.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.,

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer,
JOHN A. PENTON, Vice-President,
A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - EDITOR.
ROBERT I. CLEGG, - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - - ASSOCIATE EDITOR.

CHICAGO: 519 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST: R. A. EVANS, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

NOVEMBER 27, 1902

THE NATIONAL FOUNDERS' ASSOCIATION AND THE LABOR UNION PROBLEM.

With a membership of 494 firms, employing more than 27,000 men, the National Founders' Association has become a factor of the first importance in the handling of questions involving foundry employers and employes. Its growth has been marked in the past year, the net gain being 117—and this in a time yielding an unprecedented number of labor disputes, many of them calling for large outlays of money. Good times, multiplied demands from foundry workmen, and a remarkable growth of the Iron Molders' Union have come together. A natural sequence was the simultaneous turning of many foundry employers to the benefits and responsibilities of membership in an employers' organization.

There are employers who consider that their proper attitude toward labor unionism with its increasing power, and in many cases increasing aggressiveness, is one of antagonism. Such employers, looking upon the unjust exactions of labor organizations, their efforts to control the labor supply, shop output and the labor cost of production, and regarding the lawlessness of strikers and their intimidation and often murder of men who choose to assert a free man's privilege to remain at work and to make his own contract with his employer—are convinced that their efforts should be directed against unionism, to overthrow it and crush it out. The large majority of employers, we believe, recognizing the right of wage-earners to band together for mutual benefit, and convinced that trades unions are to be a permanent factor in industry, see that the better course for the employer is to work to restrain and eventually eliminate what is hurtful in trades unionism. Often the protest against union wrongs must be made by force—a method that must be used at times, and that may be attended with excellent educational results. Indeed, we believe its results oftentimes do not differ from those of compulsory arbitration, which has been so much lauded in certain quarters. For what difference is there in the attitude of a defeated party toward a condition forced upon him by an opponent and one forced from without, as by a New Zealand tribunal, if he considers both to be unjust? He tolerates the enforced condition as long as he must, in either case, and no longer.

But there is no dissent from the general conclusion that strikes and lockouts, like wars between nations, are wasteful and out of harmony with modern progress in so many directions. What is the best policy, then, for the employer who, whether he gives it technical "recognition" or not, finds the union to be a real factor in industry? The National Founders' Association answers: By union with other employers, have some hand in making or modifying the policy of the labor union so that it shall represent in the largest measure possible the combined intelligence of its leaders and of chosen men among employers.

Aided by the phenomenal activity in all manufacturing lines, the Iron Molders' Union has been successful in the past two years in carrying most of its demands upon the foundries, and in greatly increasing the percentage of foundry labor included in its ranks. Wage advances were in order and the scarcity of labor would have brought them in a large majority of cases, without the union. A superficial view of the situation would prompt the conclusion that as the union has had its way for the most part, organization by employers has availed little. The discussions on the floor of the Detroit convention last week show that such a judgment is far from the fact. To one who has followed the relations of the National Founders' Association and the Iron Molders' Union since they first came on a conference footing four years ago, the advance that has been made is marked. Looking on the side of the employer, the conventions of the National Founders' Association, the meetings of its administrative council and the joint conferences in which several scores of its members have participated, have been an education. Radical elements have been brought into contact with the more liberal; competitors who have had hard things to say about each other's methods, have become acquainted and have realized that bad shop practice and some of their troubles with labor have been the fruits of the strain for advantage.

That the policy of the Iron Molders' Union has been modified by the conferences of the past four years with representatives of the National Founders' Association appears in several particulars. At the recent conference at Detroit the union committee went on record against limitation of output by union decree. A Detroit union had fined certain molders engaged on piecework, for exceeding a fixed limit of daily earnings. The union officers ordered the remission of the fines and the rescinding of the limitation. There is also an advance in the attitude of the union authorities toward the apprenticeship ratio, at least to the extent of conceding that present conditions and not a decree of years back should govern in such a matter. The belief that the union could control output when it controlled the majority of skilled labor in the trade, was rudely shaken by the rapid growth of the molding machine. It is beginning to be recognized also that the machine will eventually be the solvent of the apprenticeship problem if the union refuses to aid in its solution.

Those who have given largely of their time to the

work of the National Founders' Association believe that the results more than justify its existence, and that real and permanent progress has been made.

If trades unions are left to work out their own policy in the face of antagonism from employers, there is no escape from the conclusion that that policy will have little consideration for the employer's rights and responsibilities and peculiar burdens. If the employer takes no hand in the education of trades unionists, except as he forces them to accept his views when conditions are such that two men are looking for one job, he can have no just complaint if the trades unionism of the future is more rampant, radical and unreasonable than that of today. If the experience of the National Founders' Association is a criterion, contact and conciliation promise a large return for the investment of time and money. And we believe it will be increasingly true that the labor organizations which are on a footing of conference with employers will be marked by the elimination of the restrictions which are now so fruitful a cause of friction and open rupture.

The growing power of unionism is one of the foremost facts in the industrial situation today, and there are many who see in it the greatest menace of prosperity and domestic peace. With the experience of this single organization of employers before them, the manufacturers of the country have new light on the problem.

PERSONAL.

P. L. Dryer, mining engineer for the Pratt mines, Divisions Nos. 1 and 2, of the Tennessee Coal, Iron & Railroad Co., with headquarters at Ensley, Ala., has tendered his resignation to take effect on Dec. 1.

Pierce Fluck, of South Bethlehem, Pa., who has been superintendent of the Bethlehem Foundry & Machine Co. for a number of years has resigned to become superintendent of the plant of the Lehigh Foundry & Machine Co., Fullerton, Pa.

Amos E. Gillespie, superintendent of the Duquesne furnace plant of the Carnegie Steel Co., Duquesne, Pa., has tendered his resignation to accept a similar position with a new furnace company that will erect blast furnaces at Scottdale, Pa.

Berthold Goldsmith, general manager of the Indiana plants of the American Tin Plate Co., with headquarters at Richmond, Ind., has been transferred to Pittsburg, where it is understood he will become manager of the company's plants in that district.

General Manager W. L. Simonton, of the Republic Iron and Steel Co., Chicago, Ill., visited the company's plants at Youngstown, O., last week on a tour of inspection.

Edward H. Palmer has resigned as manager of the Geneva, N. Y., plant of the American Can Co. John D. Long, of New York succeeds him.

S. S. Caskey, who for a number of years has been the superintendent of mechanical construction with the Harlan & Hollingsworth Co., has accepted a similar position with the F. F. Slocomb Co., of Wilmington, Del.

Martin Welsh, superintendent of the Hall furnace of the Republic Iron & Steel Co., Sharon, Pa., has resigned and has been appointed assistant manager of the new blast furnace of Pickands, Mather & Co., Toledo, O. Robert Coates has been appointed superintendent of the Hall furnace to succeed Mr. Welsh.

A large number of the stockholders and all of the directors of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., visited the company's properties last week as guests of President J. C. Maben and Secretary and Treasurer J. W. McQueen.

Charles W. Bennett, of Elwood, Ind., has been appointed successor to B. Goldsmith, as manager of the plants of the American Tin Plate Co. in Indiana. Thomas O'Brien, superintendent of the tin mills at Elwood, has been appointed superintendent of the Indiana district. Arthur O'Brien has been appointed local manager of the Elwood mills. These changes become effective on Dec. 1.

E. A. Henry, Wm. Logan, F. J. Miller, F. Smith, W. H. Miller, and W. H. Reed, officers of the Cuyahoga Steel & Wire Co., visited the company's plant at New Castle, Pa., last week on a tour of inspection.

Officers and directors of the American Steel & Wire Co. last week made a tour of inspection of the company's plants at Joliet, Ill. The party consisted of William P. Palmer, president, Cleveland; J. S. Keefe, first vice president, Chicago; Frank Baackes, general sales agent, Chicago; C. L. Miller, general superintendent, Pittsburg; F. H. Daniels, chief engineer, Worcester, Mass.; E. C. Lott, manager, Chicago; E. E. Stone, general purchasing agent, Chicago; C. A. Vogt, auditor, Cleveland; W. C. Stone, assistant manager, Chicago.

John Fritz entertained on the evening of Nov. 20, at his home at Bethlehem, Pa., the committee which arranged the banquet in his honor on Oct. 31, at the Waldorf-Astoria, in commemoration of his 80th birthday. Prior to the dinner in Mr. Fritz's home the visitors, mainly officers of the several engineering societies, spent three hours at the ordnance works of the Bethlehem Steel Co. and witnessed the forging of a 12-inch gun and the finishing of armor for the battleships Pennsylvania, Maryland, Colorado and West Virginia.

Edward F. Goltra, president of the American Steel Foundry Co., of St. Louis, has sailed for a short trip to Europe.

H. C. Frick is credited with the intention to donate a site, erect university buildings at Pittsburg and endow the institution with $2,500,000.

Edwin Reynolds, for many years superintendent of the Edward P. Allis Co. at Milwaukee and chief engineer of the Allis-Chalmers Co., has been made consulting engineer of the consolidated company. His nephew, Irving H. Reynolds, who was made general superintendent at the time of the change in official titles is advanced to the position of chief engineer. The position of general superintendent remains vacant for the present, but it is expected that it will shortly be filled by the advancement of E. N. Dickson or J. S. Church, the latter for years assistant superintendent of the company. Mr. Reynolds has been ill for several months on his farm in Connecticut, but is greatly improved and is expected to leave for Milwaukee about Dec. 1.

Test of Hollow Axles.

(Special Telegram.)

PITTSBURG, Nov. 26.—A large number of hollow axles for all kinds of railway purposes have now been successfully made according to the Mercader patents at the Howard Axle Works of the Carnegie Steel Co. As previously noted in these columns, these axles have a greater efficiency than the solid steel axles besides requiring less material and being lighter in weight, and require but one-fifth the machining. To give the axle a practical test, a number of steel cars that are under erection at the McKees Rocks plant of the Pressed Steel Car Co. are having one truck fitted with the hollow axles and the other truck with the solid steel axles. After being in use about six months, the axles will be examined to ascertain the wear and tear, and to learn which axle has worn the least. After these tests it is expected that a plant will be established at Homestead for the manufacture of these hollow axles, which, from tests made thus far promise to replace the solid axle.

The Georgia Iron & Coal Co., of Rising Fawn, Va., will have the recently acquired Rising Fawn furnace at that place ready for operation shortly after the first of the year. The company recently completed railroad connections to its ore and limestone properties.

The Microscope and the Structure of Iron and Steel.

At the regular monthly meeting of the Engineers' Society of Western Pennsylvania, held at Pittsburg on Saturday evening, Nov. 22, Prof. Albert Sauveur, of the Boston Testing Laboratories, delivered an address on the use of the microscope in the determination of the properties of steel. Prof. Sauveur, besides being identified with the Boston Testing Laboratories, is the professor of metallurgy in Harvard University, and is editor of the quarterly known as the *Metallographist*. Following is a synopsis of his remarks:

It may frankly be admitted that many question the reliability of the microscope in determining the physical properties of steel, but I believe this prejudice in certain quarters is bound to yield before the mass of practical information which is being furnished to manufacturers by the microscopic examination of steel sections. There are limitations in all sciences. The chemist when first introduced into steel works was expected to furnish a great deal more guidance than could properly be expected, and some steel works managers in the early days became disgusted with chemistry and discharged their chemists. The reaction soon came, and the value of the chemist in his own field is now absolutely without question. If the microscopic study of metals is taken up with proper conservatism there is no question of its great value.

The science of metallography had its origin when Dr. Sorby polished and etched metal sections and found the appearance to greatly resemble quartz. As the microscopic study of rocks gave birth to the science of petrography, so the microscopic study of steel gave rise to the science of metallography. The two are cognate, but with this important difference, that petrography is purely an investigation, while with metallography information is obtained which furnishes a guidance to the manufacturer. Metallography is therefore more than a descriptive science; it is an applied science. I shall assume, for the sake of clearness, that there are some present who are not familiar even with the rudiments of the study.

Referring to the diagrams which I show here, of iron and steel sections which have been polished and then etched in order to bring out the structure more clearly, it will be seen that the matter is arranged in polyhedric grains. The sizes of the sides are different according to the temperature from which the specimens were cooled, and the rate of the cooling. The slower the cooling from a high temperature, the larger the grains. Each grain represents a number of cubic crystals, which are orientated, the direction of orientation changing so that some of the crystals reflect the light and therefore seem white, while others do not, and appear in the diagrams as dark.

Starting with commercial iron, the product of the puddling or busheling furnace, the sections show the polyhedric structure, also black patches running through the mass. These black patches are slag, arranged in elongated layers, due to the rolling or forging process. For many years you will remember that the advocates of iron, as against steel, claimed that the advantage of iron was that it was fibrous in its nature. This theory of course has been absolutely exploded, the appearance of fiber being simply introduced by the layers of unexpressed slag due to the puddling or busheling process leaving portions of slag, which were drawn out in the subsequent working of the metal. As a matter of fact, the structure of wrought iron is not more fibrous than that of steel. When broken in the proper way iron shows the same fracture as steel, both being strictly crystalline.

Starting with pure carbonless iron, we find a structure which has been designated ferrite, being simply pure iron. Now, adding a little carbon, we find a new element introduced, which has been designated comentite. It has the chemical formula Fe_3C. This carbide or iron forms a mixture with some of the ferrite, producing what is called pearlite. As the proportion of cementite increases, the amount of pearlite formed by its union with ferrite, until a point is reached where all the ferrite has been absorbed by cementite, forming pearlite. This point of saturation is reached when we have from .8% to .9% of carbon. In steel which has not been hardened there are no elements but ferrite and pearlite.

Passing the point of saturation, as just noted, we have free cementite, the excess over the amount of cementite forming with ferrite the pearlite. Specimens of steel containing 2.5% carbon show dark and light portions, the light being pure cementite. The pearlite is relatively soft, while the ferrite is very soft. The pure cementite on the other hand is relatively hard. In high carbon steel there is an excess of cementite, and in low carbon steel an excess of ferrite.

Ordinary examinations of etched surfaces are made with a magnification of from 100 to 150 diameters, but using a very great enlargement with a specimen containing an excess of ferrite over pearlite, we find white lines representing pearlite. When the point of saturation has been reached we find no white lines. At a point where the carbon is about .45%, we find half pearlite and half ferrite. Somewhat under 1% the whole mass is pearlite. Adding now more carbon, we have specimens which are oversaturated, being composed of pearlite, with an excess of cementite left over. This cementite shows in the etchings as white streaks.

Coming now to cast iron, we find there is under the microscope a close analysis between cast iron and steel. With gray cast iron, and all the carbon in the form of graphite, we have a section which shows the structure to be a mass of carbonless iron, with interspersed a number of dark plates, which are graphite. Now examining a specimen which contains a little combined carbon, in addition to the graphitic carbon, we find a number of small areas, which are pearlite, having the same appearance as the pearlite we find in steel. Now with a little more combined carbon, bringing the percentage up to .4% or .5% combined carbon, we find the structure is mainly pearlite, with little areas of ferrite. Adding still more combined carbon, we reach a point with .7% of combined carbon, where all the structure is pearlite, with particles of graphite. Passing next the saturation point we have free cementite, giving the iron a mottled appearance. All irons having more than 1% combined carbon have a considerable proportion of cementite, showing white areas, and making the iron extra hard.

Taking a specimen of perfectly white iron, we find that the carbon exists entirely in the combined form, and the structure is a mass of pearlite and cementite. Here I wish to emphasize a point which this microscopic study has brought out, and which has not yet been sufficiently realized: that there is no distinct line between white iron and high carbon steel. There is no difference in the structure, and the one material runs right into the other. Nor is the absence of an absolute line of demarkation between the two shown by the microscope alone. Chemical analysis and physical tests alike fail to show any material difference whatever. This may be laid down as an absolute dictum, notwithstanding popular belief to the contrary.

Supposing that we removed from gray cast iron all its graphitic carbon, what would we have? The remainder would be simply steel. It may be high carbon steel or low carbon steel, this depending simply on the grayness of the original cast iron, and the quantity of combined carbon which would correspondingly be left. The matrix of gray cast iron is steel.

Having briefly reviewed metallography as a descriptive science, we now pass to applied metallography, which constitutes a distinct branch of the subject.

A very close relation exists between the structure of steel and the heat treatment. I show here six diagrams of sections all the way from a very close and fine structure to one coarsely granular. To the layman these six specimens look like different metals, but one well versed in metallography will say on inspection that they are the same metal, but have had different treatment, and will be able to tell what properties may be expected from each of the six specimens. Here is an illustration of the limitations of chemistry, as all these six specimens contain about 5% carbon. The fact is that properties depend on composition and structure. The chemist can deal only with composition. In general, I may premise that the finer and closer grained the steel, the more ductile.

The first grade which we shall consider is a steel which has a coarse large granular structure. This steel has been cast, and lacks ductility. The section specimen shows a much finer granular structure. It is the same cast steel, but has been annealed. The first would show about 5% ductility, while the second will show from 20% to 25% ductility. And yet it is

the incredible fact that there are some steel casting manufacturers who deny the value of annealing.

Taking now a third type, we have a specimen which has a coarse granular structure. This is steel which has been reheated to say 1,000° Centigrade, and been cooled slowly by artificial means. This steel will have no ductility. A fourth type which we must consider is steel which has been cooled in air, as rails formerly were. Such a specimen steel has a coarse structure. Now we have as a fifth specimen steel which after casting has been subject to hot work, and has been finished at the proper temperature, which is one not too high and not too low. This steel exhibits a fine structure, contributing to ductility. Lastly, we have a sixth example, representing steel which has been subject to cold working. The crystals observable in the other specimens have been distorted by the cold work, producing brittleness. For this reason steel which is worked much cold has to be annealed frequently, to remove this brittleness as it arises, the manufacture of cold drawn tubing being a familiar example of repeated annealings interposed between stages of cold working.

A great similarity is to be noted between the fourth specimen, representing cast steel which has been properly annealed, and the fifth specimen, representing steel which has been worked and finished at the proper temperature.

Noting again that the six specimens we have examined were all of the same chemical composition, the differences coming entirely through different heat treatment, the objection to endeavoring to obtain the proper structure in connection with a forging or rolling operation, it at once apparent. As the outside portions of the piece are cooler than the inside, the former is brought to a proper structure, while the inside portions, being much hotter, still exhibit the objectionable large granular formation, associated with lack of ductility. This observation applies with particular force to rails. With small sections, where the heat is more uniformly distributed, the method is not open to any technical objection.

I should like to answer here the objection some make to the introduction of the study of metallography in connection with practical work, in that the testing machine will show the quality of steel, and what then is the use of metallographic study? I answer, do you say this of chemistry and discard analysis? We want to know more than the bare fact that steel is defective: we want to know why it is defective, as a guide to what to do in the future. We want to know whether the defect comes from the structure or the composition. The chemist will tell us as to the composition; microscopic investigation will tell us as to the structure.

Some people take up metallography expecting to solve all their troubles in a few weeks. If they are disappointed, as they are almost certain to be, they are inclined to blame metallography. It should be remembered how hard it was for the chemist to enter the steel works, how there was a reaction against the chemist because he did not at once set everything right, and how finally his work became irrevocably bound up in the manufacture of steel. Metallography cannot be expected to solve all problems arising, but it can solve a great many.

Following the address, Prof. Sauveur exhibited the principal apparatus used in the work. In connection with studying the influence of heat treatment, a furnace is necessary, and the electric is found to be the best. The furnace exhibited consisted of a muffle, with a coil of wire around it, the whole being suitably enclosed. The heat must penetrate the muffle, and this is accomplished slowly and the heat distributed. A rheostat is necessary to regulate the current and consequently the temperature. This rheostat is located inside the current, and is operated by an arm passing outside, with a handle. By this rheostat a temperature ranging from 300° to 1200° Centigrade may be produced at will.

A large microscope was exhibited with all the usual accessories and certain special ones. For photographic work it is preferable to mount the camera directly over the microscope, and one was shown so mounted, the plate end being carried by four upright standards. For illuminating specimens under the microscope the incandescent light is preferable, but for projection the arc light is the only one intense enough. Prof. Sauveur brought out an interesting point in connection with the photographic work, in that it is desirable to use an arc light and a ray filter. This glass absorbs all the light except that of a limited wave length, which can be focused accurately on the plate with a moderate priced objective, while to use all the light without selection would necessitate the employment of a much more expensive objective.

Replying to a question as to air furnace and cupola cast iron, the professor stated that the difference was readily observed with the microscope, the air furnace iron containing more combined carbon and being therefore stronger. The structure under the microscope showed clearly the greater amount of combined carbon.

The subject of annealing coming up, Prof. Sauveur stated that the proper annealing is accomplished by bringing the steel just past the "critical temperature," which lies between 700° and 750° C. Starting with a coarse structure and great brittleness, steel by such annealing is made of a fine structure and maximum ductility.

This statement brought out one member who exhibited two forgings, identical in their manufacture except that one had been annealed. The annealed specimen had not shown the qualities desired, or which would seem to be called for by the professor's theory. On examination Prof. Sauveur stated that the "annealed" specimen has been heated to too high a temperature, which did not constitute true annealing. Heating steel to just above the critical point and then cooling would greatly improve the steel, but if heated to much above the critical temperature, which had been done in this case, the lecturer politely stated the result would be "the other way."

As to the elements of time in annealing, this was brought out to be unimportant, the desideratum being simply to heat the specimen clear through. There is no gain in maintaining the temperature, once this has been accomplished. As to cooling, there is no advantage in slow cooling, once the temperature has passed below the critical range of 700° to 750° C. Slow cooling from a high temperature makes a large difference, producing large crystals, but such changes all occur above the critical range, so that they do not enter largely into the question of true annealing.

Visitors who had done some microscopic work detailed how the specimens were prepared. A short piece was taken and the ends bent back, leaving a space about a quarter of an inch square, which was ground on emery wheels of successive fineness, and finally polished with rouge. Etching was done with nitric acid, the time being from 30 seconds to three minutes, the acid being diluted by from ten to twenty times the quantity of water.

Testimony was given in connection with the manufacture of brass and bronze that microscopic study had shown many points of value in this line.

Representatives of the Westinghouse Electric & Mfg. Co. questioned Mr. Sauveur as to the aging of steel. They had found that, curious as it might seem, steel frequently lost its magnetic value in the course of a few years, although subjected to no higher temperature than 100° C. Such steel, while originally especially valuable for armatures and fields, lost its special properties and became as ordinary steel. The lecturer questioned them as to any change which was observable in the microstructure, but as it required about 10 pounds of sheets to make an experiment to determine the aging matter, and only a very small fraction of one sheet could be examined, not a great deal had been observed. It was noted, however, that the sheets did not change uniformly.

The following were elected to membership in the society: H. S. Anderson, with H. K. Porter & Co.; Thomas H. Clagett, with Selwyn M. Taylor; Charles S. Cook, with the Westinghouse Electric & Mfg. Co.; Joseph P. Hagul, with the Jones & Laughlin Steel Co.; William H. Hammon, with the Philadelphia Co.; Charles L. Hastings, with the Bethlehem Steel Co.; W. C. Holzworth, with the American Steel & Wire Co.; Joshua L. Jones, with the H. S. Mould Co.; John H. McDonald and William Siddell, with the National Steel Co. at Bellaire; R. H. Stevens, with the Homestead Steel Works; William D. Stevenson, with the H. W. Jones Co.

The nominating committee reported the following names for officers for the ensuing year, to be voted on at the next meeting: President, C. B. Albree; first vice president, J. M. Camp; second vice president, Samuel Diescher; directors, C. B. Connelly (one year), Selwyn M. Taylor and Prof. I. M. Kintner (two years); treasurer, A. E. Frost; Secretary, C. W. Ridinger.

SIXTY YEARS IN THE IRON TRADE.

There are few iron and steel houses in this country that can look back upon 60 years of continuous connection with this business. This is the record of Joseph T. Ryerson & Son, Chicago, who have been merchants and special agents in finished iron and steel and kindred products since 1842. From a very small beginning to its present large proportions, the growth of this house has kept pace with the growth and demands of Chicago and the West. Established in October, 1842, when Chicago, with a population of only 6,000, was little more than a frontier city, the firm has steadily prospered, surviving panics and fires, until today it is doing probably the largest business in heavy iron and steel of any house in the country.

The firm was organized by Joseph T. Ryerson, the father of the present president. He went to Chicago from Philadelphia in 1842 as the accredited representative of Wood, Edwards & McKnight, of Pittsburg. It is interesting to note that the Ryerson family has been identified with the development of the iron industry in the United States since 1695. The family records show that in that year George Ryerson with two or three others purchased from the Indians 6,000 acres of land in Northern New Jersey, which they developed for its mineral and agricultural resources. His son, Martin Ryerson, pushed the development of the iron interests to the extent of manufacturing pig iron as early as 1740. His son, Thomas Ryerson, started in business as a wholesale dealer in finished iron products in Philadelphia in 1790. His son, Joseph T. Ryerson, came west and established the present firm of Joseph T. Ryerson & Son, which was continued under the founder's name until 1888, when the present corporation was organized, of which Edward L. Ryerson, son of Joseph T. Ryerson, was made president. On the sixtieth anniversary of the firm's birthday, Joseph T. Ryerson, grandson of the founder of the company and son of the president, enters the employment of the firm. The present officers of the company are: Edw. L. Ryerson, president; Herman B. Butler, treasurer, and Clyde M. Carr, secretary.

Some interesting facts regarding the history of this house are published in the last issue of its monthly journal and stock list, together with a brief description and illustrations of the machinery and site of Ryerson's forge at Bloomingdale, N. J., which was built about 1815 for the purpose of smelting the ores which came from the mines in Northern New Jersey.

Mr. Ryerson started in business in Chicago with a stock of iron worth $20,000, which he received from the Pittsburg firm of which he was agent. Up to 1871, when Chicago was destroyed by the great fire, he was compelled three times to seek larger quarters to accommodate his constantly growing business; and when that great catastrophe struck the city, his building, with hundreds of others, was reduced to ashes and his stock to a conglomerate heap of molten metal. In 1844, Mr. Ryerson engaged in the hardware business on his own account, continuing, however, his connection with the Pittsburg firm. After the fire, Mr. Ryerson temporarily leased a shed, renewed his stock, and made his office in a stable, which, strangely enough, happened to be on the corner of the site of the present premises of the company. The burned store was rebuilt, but 10 years later had to be vacated for larger quarters. Ground was purchased at 18 Milwaukee Ave., the present address of the company, and on this a three-story office and warehouse building was erected, the nucleus of the present warehouses. The business of the company has grown rapidly since that time, necessitating many additions to its warehouses. The firm now occupies a building, five stories high, covering nearly an entire block, and even this has become inadequate for its needs. A year ago, work was commenced on new warehouses located on the Pennsylvania railroad tracks, at Fifteenth, Sixteenth and Rockwell Sts., which is practically completed. The main building is 266x175 feet, 60 feet high, with an annex one story in height 112x125 feet, giving a floor space of over 107,000 square feet. The main building has railroad tracks running through its entire length, these connecting with all trunk lines. This building is equipped with overhead traveling cranes on each floor. Serving these cranes, are trolleys running the entire width of the building. In addition, there have been installed a heavy electrically controlled plate shear, and a powerful cold saw for heavy structural shapes. Lighter beams, bars and angles are sheared, punched or coped on a combined machine built especially for that purpose. The corporation has lately added to the facilities of these new warehouses, a structural yard, 300x500 feet, which is being equipped with electrically driven traveling cranes, with 100-foot spans. This additional area of 150,000 square feet will be used for handling the longest lengths of beams, channels and other structural shapes. The various warehouses and structural yards of the company, with almost unlimited storage facilities, cover an area of nearly three blocks.

A Pittsburg Plant for Briquetting Fine Ores.

(Special Telegram.)

PITTSBURG, Nov. 26.—The Jones & Laughlin Steel Co. has placed a contract with the Henry S. Mould Co., of this city, for an ore and flue dust briquetting outfit. The plant is to be located in the vicinity of the Eliza blast furnace plant and is to provide the four furnaces with briquettes. An injunction suit is pending, the decision in which has not yet been handed down, the property owners of the Oakland district seeking to prevent the Jones & Laughlin Steel Co. from operating its furnaces, on account of the large amount of flue dust that escapes and covers the entire Oakland district. To overcome this, the briquetting method will be tried. It is predicted that this process will prove successful, for the reason that both ore and flue dust briquettes recently made have more than withstood the burden which they will bear in a blast furnace, while the binder has withstood the heat it will be subjected to above the melting zone of a furnace. The briquetting of the fine ores will be watched with much interest by the blast furnace operators of the country, as all have had considerable trouble with their furnaces, on account of the use of the fine ores and if these can be briquetted successfully no doubt briquetting will be generally resorted to.

Death of Herr Krupp.

Frederich Alfred Krupp, the great gun maker and manufacturer of many forms of railway, ship and structural steel, and reported to be the wealthiest man in Germany, died Nov. 22 at his villa at Huegel. He had been ill several days and had endured great mental distress on account of recent attacks made upon him, but the immediate cause of death was apoplexy. As soon as his death was announced the great Krupp works in Essen, where 25,000 men are employed, were closed. Herr Krupp was 41 years old.

The business was started in 1810 by Peter Freidrich Krupp, who in 1811 built his first furnace. He died in 1826, leaving the secret processes he had discovered and the business to his son, Alfred, a boy of 14. In 1864 rail and plate mills were erected and in 1869 the Siemens-Martin process of steel making was introduced. On July 14, 1887, Alfred Krupp died, leaving his son, Frederich Alfred, to succeed him. Between 1890 and 1892 the manufacture of armor plate was started. Over 43,000 men were employed in the steel works at Essen, at the works at Backau, the Germania Shipbuilding yard at Kiel, in coal mines, blast furnaces and proving grounds. Thirty-four governments have purchased guns from Krupp.

Both Alfred Krupp and his son, who has just died, devoted much time to improving the conditions of their workingmen, administering to their comfort and happiness. The late Herr Krupp owned 5,469 dwellings, constructed with great care as to architectural beauty and sanitary arrangements, and these were rented to employes at low rates. He also had convalescent hospitals and orphanages. He had a pension fund for his employes amounting to $4,125,000. He contributed last year, as required by law, $372,000 to the national insurance fund, and gave voluntarily $4,080,000 to other insurance funds. Unlike his father, Herr Krupp took no interest in the technical side of his business. Yet, in fifteen years, he more than doubled the fortune he inherited. Since their foundation the Essen factories have turned out 41,000 pieces of artillery. Herr Krupp resented being called the "Cannon King," and he said that half of all the output of his works was civilizing products, such as railway and merchant ship material and structural steel. Herr Krupp is survived by a widow and two daughters.

Detroit Convention of National Founders' Association.

In our issue of last week the opening proceedings of the National Founders' Association's convention at Detroit were given, with a synopsis of the reports of the president, commissioner and secretary. The attendance, which on the opening day was nearly 200, ran up to about 230. As indicating the representative character of the convention which included about 45 percent of the membership we give below the full registration of those in attendance:

List of Delegates.

W. D. Sargent, American Brake Shoe & Foundry Co., New York City.
F. T. Towne, Yale & Towne, Mfg. Co., Stamford, Conn.
John R. Russel, Russel Wheel & Foundry Co., Detroit.
O. P. Briggs, Minneapolis Steel & Machinery Co., Minneapolis, Minn.
Willis Brown, Walker Foundry Co., Erie Pa.
W. L. Herendeen, Herendeen Mfg. Co., Geneva, N. Y.
C. L. Newcomb, Deane Steam Pump Co., Holyoke, Mass.
Wm. M. Taylor, Chandler & Taylor Co., Indanapolis, Ind.
J. H. Webster, Variety Iron Works, Cleveland.
Jno. E. McIntosh, McIntosh, Seymour & Co., Auburn, N. Y.
Joseph Wright, Dominion Rodiator Co., Toronto, Canada.
Edward F. Jones, Jones of Binghamton, Binghamton, N. Y.
R. D. Reed, H. B. Smith Co., Westfield, Mass.
Edward Maher, Maher & Flockhart, Newark, N. J.
Thos. E. Durban, Erie City Iron Works, Erie, Pa.
John A. Rathbone, United States Heater Co., Detroit.
A. I. Lewis, Michigan Brass & Iron Works, Detroit.
Geo. A. True, Northern Engineering Works, Detroit.
H. N. Covell, Lidgerwood Mfg. Co., Brooklyn, N. Y.
J. K. Kirkwood, Fanner Mfg. Co., Cleveland.
E. H. Penning, Walworth Run Foundry, Cleveland.
W. B. Green, Palmers & DeMooy Fdy. Co., Cleveland.
C. F. Seelbach, Forest City Fdy. Co., Cleveland.
H. J. Boggis, The Taylor & Boggis Foundry Co., Cleveland.
C. J. Morgan, The Taylor & Boggis Fdy. Co., Cleveland.
John E. Zimmerman, Eureka Foundry Co., Dayton, O.
E. C. Hoffman, Hoffman Hinge & Fdy. Co., Cleveland.
Julius Beeman, Hoffman Hinge & Foundry Co., Cleveland.
John Stuber, Ohio Foundry Co., Cleveland.
Wm. Greenbaum, Acme Foundry Co., Cleveland.
C. M. Miller, Superior Foundry Co., Cleveland.
J. L. Jackson, Jackson & Church Co., Saginaw, Mich.
J. W. Osborn, Walworth Run Foundry Co., Cleveland.
C. C. Scheible, Walworth Run Fdy. Co., Cleveland.
Thos. M. Roche, Secretary Cleveland Founders' Association.
Thos. M. Eynon, Eynon-Evans Mfg. Co., Philadelphia.
H. M. Wallis, J. I. Case Plow Works, Racine, Wis.
H. F. Miller, Acme Foundry Co., Cleveland.
T. H. Benners, Birmingham Machine & Foundry Co., Birmingham, Ala.
W. D. Tynes, Hardie-Tynes Foundry & Machine Co., Birmingham, Ala.
T. J. Caldwell, Caldwell-Watson Foundry & Machine Co., Birmingham, Ala.
Benj. F. Fox, Benj. Fox's Sons, New York City.
W. A. Russell, Michigan Brass & Iron Works, Detroit.
D. J. Kilby, Kilby Mfg. Co., Cleveland.
Wm. H. Baush, Baush Machine Tool Co., Springfield, Mass.
Louis Epp, Deere & Mansur Co., Moline, Ill.
M. E. Kennedy, Kennedy Valve Mfg. Co., New York City.
Jas. Eastwood, Benj. Eastwood Co., Peterson, N. J.
Chas. T. Wales, Empire Foundry Co., New Brunswick, N. J.
A. J. Vierling, Paxton & Vierling Iron Works, Omaha, Neb.
Louis Vierling, Vierling, McDowell & Co., Chicago.
Thos. Hoops, Jr., Wilcox, Crittenden & Co., Middletown, Conn.
W. W. Balkwill, Cleveland Steel Castings Co., Cleveland.
Alonzo W. Whitcomb, Kabley Mfg. Co., Worcester, Mass.
W. S. Hanse, Stover Mfg. Co., Freeport, Ill.
A. S. Held, Stover Mfg. Co., Freeport, Ill.
E. L. Walcott, Modern Iron Works, Quincy, Ill.
Chas. A. G. Winther, Chapman Valve Mfg. Co., Indian Orchard, Mass.
Ellis L. Rowe, Rensslaer Mfg. Co., Troy, N. Y.
Wm. Gleason, Genesee Foundry Co., Rochester, N. Y.
Fred F. Stockwell, Barbour-Stockwell Co., Boston.
W. A. Porter, E. W. Bliss Co., Brooklyn, N. Y.
Chas. A. Stowers, Akron Engineering Co., Akron, O.
Henry A. Carpenter, A. Carpenter & Sons Foundry Co., Providence, R. I.
J. G. Pope, Falls Rivet & Machinery Co., Cuyahoga Falls, O.
Frank Fiebeger, Akron Foundry Co., Akron, O.
L. S. Dickey, Macbeth Iron Co., Cleveland.
Chas. A. Maher, Maher Wheel & Foundry Co., Cleveland.
Wm. C. Doherty, Doherty Bros., Lowell, Mass.
J. L. Anthony, Weir Stove Co., Taunton, Mass.
R. M. Leach, Weir Stove Co., Taunton, Mass.
C. F. Wheaton, Dodge Mfg. Co., Toronto, Ont.
Geo. B. Buckingham, Arcade Malleable Iron Co., Worcester, Mass.
J. F. Lanigan, Davis Foundry Co., Lawrence, Mass.
C. S. Bonsall, Buckeye Engine Co., Salem, O.
S. V. Kennedy, D. M. Osborne & Co., Auburn, N. Y.
Stanley G. Flagg, Jr., Stanley G. Flagg & Co., Philadelphia.
L. E. Thomas, United Engineering & Fdy. Co., Youngstown, O.
G. R. Metcalf, Erie Malleable Iron Co., Erie, Pa.
Geo. E. Camp, Standard Harrow Co., Utica, N. Y.
Alexander Jarecki, Jarecki Mfg. Co., Erie, Pa.
E. G. Rippel, Buffalo Foundry Co., Buffalo, N. Y.
W. E. Miller, Fairbanks, Morse & Co., Chicago.
F. A. Ingalls, Buda Foundry & Mfg. Co., Harvey, Ill.
Geo. W. Watts, Canada Foundry Co., Toronto, Ont.
R. H. Gilmour, Canada Foundry Co., Toronto, Ont.
Geo. Wiard, Wiard Plow Co., Batavia, N. Y.
S. H. Chapman, Ontario Wind Engine & Pump Co., Toronto, Ont.
F. D. Wanning, Birmingham Iron Foundry Co., Derby, Conn.
Walter Perry, Farrell Foundry & Machine Co., Ansonia, Conn.
H. P. Ranney, American Shipbuilding Co., Cleveland.
Robert Weir, Weir & Craig Mfg. Co., Chicago.
Jno. N. Woodfin, Lincoln Iron Works, Rutland, Vt.
Edward King, Pennsylvania Engineering Works, New Castle, Pa.
O. R. Hanchett, Ideal Foundry Co., Ashtabula, O.
A. N. Abbe, P. & F. Corbin, New Britain, Conn.
O. P. Letchworth, Pratt & Letchworth Co., Buffalo, N. Y.
E. H. Walker, J. I. Case Threshing Machine Co., Racine, Wis.
H. Van Atta, J. L. Mott Iron Works, N. Y.
H. Ainsworth, Williams, White & Co., Moline, Ill.
J. C. Bradley, Pratt & Letchworth Co., Buffalo, N. Y.
S. S. Gould, Gould's Mfg. Co., Seneca Falls, N. Y.
F. E. Wheeler, International Heater Co., Utica, N. Y.
E. H. Cole, Eaton, Cole & Burnham Co., New York City.
W. F. Lloyd, Eaton, Cole & Burnham Co., New York City.
Jas. McNaughton, American Locomotive Co., Dunkirk, N. Y.
Wm. Barton, Barton & Maas Foundry Co., Chicago.
Henry E. Pridmore, Chicago.
E. E. Durant, Geo. F. Warner Mfg. Co., New Haven, Conn.
H. A. Laycock, Economy Foundry & Machine Co., Syracuse, N. Y.
F. A. Scheffler, Marine Engine & Machine Co., Harrison, N. J.
Arthur E. Barlow, Newark, N. J.
Jno. M. Taylor, Taylor-Forbes Co., Ltd., Guelph, Ont.
J. E. Hunter, Jas. Hunter Machine Co., North Adams, Mass.
D. F. Eagan, Henry E. Pridmore, Chicago.
Thos. Devlin, Thos. Devlin Mfg. Co., Philadelphia, Pa.
H. Gilbert Hart, Hart & Crouse, Utica, N. Y.
F. E. Delano, Ideal Mfg. Co., Detroit.
A. I. Findley, *The Iron Trade Review*, Cleveland.
W. A. Stevenson, Norwood Engineering Co., Florence, Mass.
E. F. DuBrul, National Metal Trades Association, Cincinnati.
P. Kennedy, Kennedy Foundry, Baltimore, Md.
E. R. Beeman, Monitor Drill Co., Minneapolis, Minn.
David Townsend, Gruson Iron Works, Eddystone, Pa.
Wm. S. Hallowell, Harrison Safety Boiler Works, Philadelphia.
W. N. Kuhns, Kuhns Bros., Dayton, O.
F. Macon Cresson, Geo. V. Cresson Co., Philadelphia.
E. L. Dawes, Standard Sanitary Mfg. Co., Pittsburg.
Oscar Marschurtz, Standard Sanitary Mfg. Co., Louisville, Ky.
T. W. Sheriffs, Sheriffs Mfg. Co., Milwaukee, Wis.
R. W. Grace, Bucyrus Co., Milwaukee, Wis.
Wm. Francis, Francis & Nygren Co., Chicago.
Harry S. Hodge, Detroit.
H. L. Ide, A. L. Ide & Sons, Springfield, Ill.
Enos Bookwalter, A. L. Ide & Sons, Springfield, Ill.
Antonio C. Pessano, Great Lakes Engineering Works, Detroit.
Paul B. Morgan, Morgan Construction Co., Worcester, Mass.
Ralph E. Kingsbury, Morgan Construction Co., Worcester, Mass.
J. A. Oberhelman, J. A. Oberhelman Foundry Co., Cincinnati.
Geo. McG. Morris, Jno. B. Morris Foundry Co., Cincinnati.
R. H. North, North Bros. Mfg. Co., Philadelphia.
Stuart R. Carr, Stuart R. Carr & Co., Baltimore, Md.
Jas. S. Stirling, Harlan & Hollingsworth Co., Wilmington, Del.
Geo. T. Marsh, South Baltimore Foundry, Baltimore, Md.
Geo. T. Brown, Brown Cotton Gin Co., New London, Conn.
W. T. Partridge, *Iron Age*, Chicago.
Lyman P. Hubbell, Filmore Ave. Foundry & Iron Works, Buffalo.
J. L. Ketcham, Brown-Ketcham Iron Works, Indianapolis, Ind.
Robert Weust, National Metal Trades Association, Cincinnati.
H. J. Rober, Bettendorf Metal Wheel Co., Springfield, O.
Henry B. Sargent, Sargent & Co., New Haven, Conn.
Wm. Gilbert, Buckeye Foundry Co., Cincinnati.
Wm. Yagle, Wm. Yagle & Co., Pittsburg.
W. C. Scott, Thos. Carlin's Sons Co., Allegheny, Pa.
S. E. Hilles, Samuel C. Tatum Co., Cincinnati.
Henry J. Gosiger, Eureka Foundry Co., Cincinnati.
H. D. Erhart, Chris. Erhart, Cincinnati.
Salmon Jones, Jones & Bruce, Cincinnati.
A. G. Wilson, Hoefinghoff & Laue Co., Cincinnati.
C. E. Greenwald, I. & E. Greenwald Co., Pittsburg.
F. S. Jackman, Pittsburg Mfg. Co., Pittsburg.
F. Johannigmann, Johannigman Foundry Co., Cincinnati.
Henry J. Weber, Newport Brass & Iron Foundry Co., Newport, Ky.
Frank Land, Gaar Scott & Co., Richmond, Ind.
Oliver Phelps, Lorain Foundry Co., Lorain, O.
A. D. Plamondon, A. Plamondon Mfg. Co., Chicago.
J. D. Leary, Queen City Foundry Co., Cincinnati, O.
Lincoln Haney, The Globe Foundry, Cincinnati.
H. F. Frohman, Obermayer Co., Cincinnati.

W. E. Rockwood, Rockwood Mfg. Co., Indianapolis, Ind.
H. M. Wilson, Taylor, Wilson & Co., Allegheny, Pa.
J. H. Morcom, Colorado Iron Works Co., Denver, Col.
Chas. W. Pusey, Pusey & Jones Co., Wilmington, Del.
C. W. Russel, Russel Wheel & Foundry Co., Detroit.
Mr. Walter Laidlaw, Laidlaw-Dunn-Gordon Co., Cincinnati.
Jos. A. Stone, Riverside Foundry Co., Cleveland.
P. J. Martin, Lakeside Malleable Iron Co., Racine, Wis.
A. W. Russel, Russel Wheel & Foundry Co., Detroit.
J. Dwyer, Michigan Stove Co., Detroit.
H. K. McLean, Link-Belt Machinery Co., Chicago.
T. A. Jones, W. A. Jones Fdy. & Machine Co., Chicago.
Johnson Stewart, Co-operative Foundry Co., Detroit.
W. E. Stewart, Co-operative Foundry Co., Detroit.
Thos. F. Meek, Detroit Steel Castings Co., Detroit.
Elmer Maine, Detroit Steel Castings Co., Detroit.
Rutledge Armstrong, Detroit Steel Castings Co., Detroit.
S. T. Johnson, Whiting Foundry Equipment Co., Harvey, Ill.
R. C. Barr, Cleveland & Barr, Chicago.
T. A. Cummings, R. M. Eddy Foundry Co., Chicago.
W. J. Michael, Tarrant Foundry Co., Chicago.
P. W. Gates, Allis-Chalmers Co., Chicago.
Chas. M. Power, St. Paul Foundry Co., St. Paul, Minn.
Geo. Harroun, Medart Patent Pulley Co., St. Louis.
H. L. Whitman, Whitman Agricultural Co., St. Louis.
Allen R. Foot, *Public Policy*, Chicago.
V. B. Calder, Detroit Shipbuilding Co., Detroit.
T. H. Simpson, Michigan Malleable Iron Co., Detroit.
F. H. Harris, Harris Toy Co., Toledo, O.
Edward C. Wells, Quincy Engine Works, Quincy, Ill.
Frank D. Runser, Mahoning Foundry & Machine Co., Youngstown, O.
H. M. Leland, Leland & Faulconer Mfg. Co., Detroit.
Jas. J. Wilson, Leland & Faulconer Mfg. Co., Detroit.
C. H. Carrier, Carrier, Laine & Co., Levis, Que.
H. W. Hoyt, Allis-Chalmers Co., Chicago.
B. F. Skinner, Advance Thresher Co., Battle Creek, Mich.
Wm. Inglis, John Inglis & Sons, Toronto, Ont.
F. T. Frost, Frost & Wood Co., Ltd., Smith Falls, Ont.
Thos. P. Gaddis, Dayton Malleable Iron Co., Dayton.
D. F. O'Neil, Western Foundry Co., Chicago.
Henry Laidlaw, Laidlaw-Dunn-Gordon Co., Cincinnati.
Andrew J. Caldwell, Crane Co., Chicago.
J. L. Halyburton, Michigan Brass & Iron Works, Detroit.
Wm. Scott, Roe Stephens Mfg. Co., Detroit.
B. Frank Beatty, Penn Steel Castings Co., Chester, Pa.
T. L. Moffat, Moffat Stove Co., Weston, Ont.
J. B. Jones, Utica Heater Co., Utica, N. Y.
T. J. Drummond, Montreal Pipe Foundry Co., Montreal, Que.
Wm. Hamilton, Wm. Hamilton Mfg. Co., Peterborough, Ont.
L. R. Cope, Vincent Valve Co., Sandusky, O.
R. R. Sauntleroy, Link-Belt Machinery Co., Chicago.

FRED. T. TOWNE, PRESIDENT-ELECT.

Phases of the Convention.

While the National Founders' Association has been in existence but a little more than four years its growth in solidity, in intelligent conception of its work and of the best methods of accomplishing it, and in appreciation of the far-reaching possibilities of such united effort, is not difficult of measurement by one who has had opportunity to watch its development. The past year has been one that tested the temper of the organization, several struggles with the Iron Molders' Union being protracted and involving a large outlay on both sides. Yet the report of the secretary showed a large increase in membership, the net gain being 117 and the total at date 494.

The meetings were held in the assembly room of the Cadillac and all were well attended, there being a morning and an afternoon session on Wednesday and Thursday in addition to various meetings of the administrative council. An important matter before the council was the strike of the molders in the light gray iron foundries of Cleveland.

One feature of the convention worthy of note was the presence and active participation in its councils of three ex-presidents: P. W. Gates, of the Allis-Chalmers Co., Chicago; O. P. Letchworth, of the Pratt & Letchworth Co., Buffalo, and H. W. Hoyt, of the Allis-Chalmers Co., Chicago. They had seats on the platform with President W. D. Sargent and were received with enthusiasm by the members of the convention.

Questions Under Discussion.

For the direction of the deliberations of the convention a series of questions was presented. Some of these received considerable attention in the general discussion of the association's policy; others were only incidentally referred to. The list is as follows:

1. Should the association, as an association, take any stand in reference to the desirability of continuing or discontinuing the local agreements that have been made in some places between foundry employers and their molders, or coremakers?

2. It is desirable that the association should instruct its administrative council to endeavor to arrange satisfactory National agreements with either molders or coremakers, providing the organization referred to were to change several restrictions that violate natural laws?

3. What should be the policy of the association towards the effort of labor organizations to restrict the number of apprentices?

4. What should be the attitude of this association with reference to the efforts of labor organizations to abolish piece work?

5. What should be the association's policy with reference to the continuous limitation of output on the part of labor organizations?

6. What should the association's policy be with reference to operating molding machines?

7. Is it desirable that the association should acquiesce in any way in a movement to reduce the hours of labor?

8. What should be the association's policy in the case of attempt on the part of labor organizations to prevent non-union men from going to work?

9. What policy should be pursued when an effort is made to prevent a member of this association, who has satisfactory arrangements with his employes, and with whom there is no quarrel, from making work for a concern with which some labor organization is having a dispute?

10. What policy should be pursued to encourage foundry concerns who are not members of this association to become affiliated with it?

The Nine-Hour Work Day.

Foremost in importance of the matters now up between the association and the Iron Molders' Union is that of a nine-hour day in the foundry. As already indicated in the report we have published of the recent conference at Detroit between representatives of the two organizations, the molders have

asked for a national agreement embodying the nine-hour provision for the foundries represented in the N. F. A. The discussion in the convention was brought on by the presentation of the report of the Detroit conference committee by Antonio C. Pessano. Mr. Pessano reviewed the various proposals that came before the conference and detailed the resolutions presented by the foundrymen and the molders. He called attention to the disavowal by the union representatives, of any policy of limiting output. They affirmed their opposition to any attempt looking to the arbitrary or unreasonable limitation of output on the part of the molder. As an instance of what they were contending against in this particular, the foundrymen's conferees brought to the attention of the molders' conferees the case of a Detroit foundry in which both piece work and day work go on side by side. The day workers, owing to the conditions existing as to molding floor space, cupola capacity, etc., were able to finish early in the afternoon. They had consequently imposed restrictions upon the piece workers so that they should only do a corresponding day's work. This led to a definite limit of $3.60 as the maximum a piece-worker was allowed to earn. Fines had been imposed upon several men for exceeding this limit. The molders' conferees took the matter up at once, and secured the remission of the fines and ordered the removal of the limitation upon the earning power of the piece-workers.

In the discussion which followed the presentation of Mr. Pessano's report for the Detroit conferees there was some exchange of views and experience relative to the nine-hour day. It appeared that in New York City and Brooklyn, and to a considerable extent in Boston and in other Eastern industrial centers the nine-hour day in the foundry had already come. As to the results there was varying testimony. Some of the foundrymen present said that as much work was done in nine hours as had been done before in ten—a fact which signified to some that they had not had a full day's work before. However, others were disposed to credit their men with an extra effort to keep the product up to what it had been, so that labor cost might not be increased. On the other hand there were founders present who found that their output was just nine-tenths as much in a nine-hour as in a ten-hour day, and therefore the change increased the labor cost of product just 10 percent.

There was strong objection, particularly from foundrymen in the smaller cities to any change in hours. These contended that while some concerns in the larger cities had made the change it was their misfortune, and that the manufacturer in the smaller place, subject to the provincialisms of life in such centers, should consider the longer workday with its increased product as some compensation for advantages which his city competitor enjoyed in other respects. The city of Buffalo was cited as one in which a 10-hour day is provided by existing agreement which runs until Oct. 1, 1903. In Cincinnati, on the other hand, there is a sentiment favorable to a nine-hour day provided certain restrictions now enforced are removed. In Indianapolis, while the molders have agitated for a nine-hour day, they have seemed more concerned about wages than a shorter workday and have already indicated a willingness to accept a 10-hour day as a part of the agreement for the calendar year 1903. This was cited as indicating that the molders were not a unit in following the policy recommended by the Toronto convention, of making the nine-hour day the foremost issue, with all else secondary.

The discussion on the recommendation of the Detroit conferees that hereafter the members of the N. F. A. enter into no local agreements turned on the construction to be given this feature of the report. It was suggested by the members of the committee of conference that this did not at all mean that foundrymen were not to enter into such agreements as they might wish to make with their employes; nor that the questions of wages and hours should be settled by one National conference for all the members of the association. The interpretation put upon the recommendation was rather that foundrymen should not enter into agreements without consultation with the administrative council. This was advised as the best means of avoiding conflicting usages that had been found to be detrimental to the common interest. Individual firms had been known to enter into agreements which were detrimental to shops in nearby cities or in adjoining districts. The purpose of the committee was to have such co-operation with the officers of the association as would avoid differences in practice and in shop custom. Any intention of trying to make a flat rate of wages or to bind a uniform workday on all foundries was disclaimed.

Action on a National Agreement.

The outcome of the whole discussion was the reference of the matter to the conferees and the administrative council. The result of their deliberations was presented to the convention on Thursday morning by Mr. Pessano in the following form and was unanimously adopted:

WHEREAS, At a joint conference held between representatives of the Iron Molders' Union of North America and the National Founders' Association, in the city of Detroit, Oct. 8, 9, 10, and 11, 1902, the following joint resolutions were unanimously adopted:

WHEREAS, If is the conviction of those who have given the subject of the relations of the employer and employe the greatest amount of study, that the most equitable way to adjust such questions as may arise to disturb said relations, is by the joint discussion of the issues involved by those directly interested or their representatives; and,

WHEREAS, It would further appear that when decisions have been arrived at that the interests of all parties are more effectually conserved by recording such adjustments in the form of agreements that define as far as may be possible the positions of all the interested parties; and,

WHEREAS, In the course of their relations the Iron Molders' Union and the National Founders' Association have entered into a number of said agreements, some of which are not similar in all of their terms; and,

WHEREAS, Said variations have not been productive of the best results, but have on the contrary promoted a feeling of uncertainty; and,

WHEREAS, There are a number of localities and many members of both organizations not at this time affected by any agreement whatever; therefore be it

Resolved, That it is the opinion of this joint conference representing the Iron Molders' Union of North America and the National Founders' Association, that the time has arrived when in its judgment the purposes of the two bodies will be best promoted by the formulation of a general form of agreement, national in its character, for each class of foundries, and that as far as possible it should cover all the points arising in foundries of the class covered by said agreement, and be subject to such modification in detail as may be necessary to meet the needs and conditions prevailing in the districts into which the membership of the Iron Molders' Union and the National Founders' Association may properly be divided, all such modifications to be of general application in the district for which they have been formulated.

Now therefore, be it resolved, by this association that the above resolutions are hereby endorsed, and be it further

Resolved, That this convention, having in view the adoption of a yearly national agreement covering the principles upon which the foundries of its members shall be conducted, the members are requested and the Administrative Council of this association is hereby instructed not to make any more local agreements.

Resolved, That this association in favoring the making of a yearly national agreement with the Iron Molders' Union of North America does so only on condition that any such agreement must embody equitable conditions relating to apprentices, restriction of output, set day's work, limitation on a man's earning capacity, abolishing of fines imposed on molders for the purpose of limiting an individual molder's production, the right of an employer to operate molding machines or any other foundry appliance in accordance with his best judgment and to maintain equitable piecework and premium systems, the abolition of a flat minimum wage rate and the establishment of a differential wage rate for molders.

Resolved, That it is the sense of this convention that the establishment of a 9-hour day is a local and not a national issue, and that any demand that may be made upon members of this association for a change in the hours of a working day shall be considered and acted upon in accordance with the New York agreement; and further, that no agreement shall be entered into favoring a shorter work day unless the conditions recited in the preceding resolution are made a part thereof.

Resolved, That this convention endorses the action of its conference committee in refusing to discuss the 9-hour ques-

tion except upon the conditions above enumerated.

The Molding Machine.

The molding machine question, among those propounded for discussion in the convention program, was given attention in a separate resolution which was unanimously adopted. It follows:

"Resolved, That it is the sense of this convention that it is the absolute right of any member of this association to operate a molding machine, or any mechanical device to further

I. W. FRANK, VICE-PRESIDENT.

molding, in such manner as best serves his interests, and that the strength and resources of this association, as provided for by the constitution and by-laws, be and are hereby pledged to the support of a member making such use of a molding machine."

Election of Officers.

The report of the nominating committee, which consisted of P. W. Gates, O. P. Letchworth and A. C. Pessano, was presented at the closing session, Thursday afternoon. In referring to the choice of Mr. Fred T. Towne for president, Mr. Gates told of the visit of the committee to the great plant under Mr. Towne's management, employing no less than 3,000 men, and of the important reasons, all apparent to the committee, which seemed to compel Mr. Towne to give a negative answer. The interests of the association were so strongly urged upon him that Mr. Towne's consent was finally obtained—an outcome on which the association was to be earnestly congratulated. All the officers recommended by the committee were elected by unanimous ballot. The list is as follows:

President, F. T. Towne, Yale & Towne Mfg. Co., Stamford, Conn.

Vice President, Isaac W. Frank, United Engineering & Foundry Co., Pittsburg.

Treasurer, John R. Russel, Russel Wheel & Foundry Co., Detroit, Mich.

Secretary, A. E. McClintock, Detroit. Mich.

COMMITTEES.

First District—R. D. Reed, chairman, H. B. Smith Co., Westfield, Mass.; Geo. H. Gibby, vice chairman, Condor Iron Foundry Co., Boston, Mass.; Howard S. Hart, Russell & Erwin Mfg. Co., New Britain, Conn.; Paul B. Morgan, Morgan Construction Co., Worcester, Mass.; F. B. Farnsworth, McLagon Foundry Co., New Haven, Conn.

Second District—W. L. Herendeen, chairman, Herendeen Mfg. Co., Geneva, N. Y.; H. VanAtta, vice chairman, J. L. Mott Iron Works, New York; Jas. H. Caldwell, Ludlow Valve Co., Troy, N. Y.; Arthur E. Barlow, Newark, N. J.; H. W. Wendt, Buffalo Forge Co., Buffalo, N. Y.

Third District—Willis Brown, chairman, Walker Foundry Co., Erie, Pa.; W. S. Hallowell, vice chairman, Harrison Safety Boiler Works, Philadelphia; J. S. Stirling, United States Shipbuilding Co., Wilmington, Del.; Howard Carlton, South Baltimore Foundry Co., Baltimore, Md. H. M. Wilson, Taylor, Wilson & Co., Pittsburg, Pa.

Fourth District—J. H. Webster, chairman, Variety Iron Works Co., Cleveland, O.; J. D. Leary, vice chairman, Queen City Foundry Co., Cincinnati, O.; Chas. A. Stowers, Akron Engineering Co., Akron, O.; C. H. Morgan, Morgan Engineering Co., Alliance, O.; H. J. Boggis. The Taylor & Boggis Foundry Co., Cleveland, O.

Fifth District—Wm. M. Taylor, chairman, Chandler & Taylor Co., Indianapolis, Ind.; H. K. McLean, vice chairman, Link-Belt Machinery Co., Chicago; Fer'd Schwedtman, Magnetite Foundry Co., St. Louis, Mo.; Lewis Searing, Denver Engineering Works Co., Denver, Col.; C. R. Stephens, Moline Plow Co., Moline, Ill.

Sixth District—O. P. Briggs, chairman, Minneapolis Steel & Machinery Co., Minneapolis, Minn.; Irving H. Reynolds, vice chairman, Allis-Chalmers Co., Milwaukee, Wis.; C. M. Power, St. Paul Foundry Co., St. Paul, Minn.; T. J. Neacy, Filer & Stowell Co., Milwaukee, Wis.; E. H. Walker, J. I. Case Threshing Machine Co., Racine, Wis.

Seventh District—C. Bermingham, chairman, Canadian Locomotive Co., Ltd., Kingston, Ont.; W. Angus, vice chairman, Canada Switch & Spring Co., Montreal, Que.; Chas. H. Carrier, Carrier, Laine & Co., Levis, Que.; G. W. Watts, Canada Foundry Co., Toronto, Ont.; H. Cockshutt, Cockshutt Plow Co., Brantford, Ont.

Eighth District—T. H. Benners, chairman, Birmingham Machine & Fdy. Co., Birmingham, Ala.; E. Van Winkle, vice chairman, E. Van Winkle Gin & Machine Co., Atlanta, Ga.; P. H. McArdle, Standard Pulley Mfg. Co., New Orleans, La.; W. D. Tynes, Hardie-Tynes Fdy. & Machine Co., Birmingham, Ala.; A. D. Schofield, J. S. Schofield Sons' Co., Macon, Ga.

After the election of Mr. Towne as president had been declared, President Sargent appointed ex-Presidents Gates and Hoyt to escort him to the chair. He was given a most enthusiastic reception and in acknowledgement of this and of his election, spoke briefly.

"No one who gives any thought to the industrial conditions of the country today," said Mr. Towne, " can help being impressed with the rapid growth and vigor of trades

J. R. RUSSEL, TREASURER.

unionism, and the manner in which it is extending its influence in all branches of industry, and of the power which unions possess by virtue of their united action and singleness of purpose. That power unrestrained and unrestricted inevitably leads to imposing conditions upon the employer of labor that are intolerable. How to restrict and restrain that power is the problem that confronts the manufacturers of this country today, and the members of the National Founders' Association.

"Our association offers to the foundrymen of the country a form of protection which, single handed, they are unable to obtain. By virtue of its strength, unreasonable demands of labor organizations may be held in check and the right of the employer to conduct his business in such manner as he may see fit is assured, provided he keeps within the limits of justice and fairness. That the necessity for such organization exists we are all ready to admit. But there is a surprising unwillingness, as there has been in the past, and

ANTONIO C. PESSANO, CONFEREE.

there seems to be always unwillingness on the part of the manufacturers of the country to join in any earnest efforts to forward the cause. They are too prone to leave it to the other fellow, and as a result the work is often left undone; and yet we have before us in the unions, and particularly the Iron Molders' Union, an example of energy and organization which are hardly matched in any other similar line of work. We have that constantly before us; and yet many of our members, particularly many outsiders, today are unwilling to give their time or their financial aid in forwarding our cause. Let us take example from our honorable opponents. Let us endeavor during the coming year to advance the work of the association, first of all by securing new members as being necessary if the organization is to grow and if the scope of the organization is to increase; secondly by giving financial aid when called upon; and last, and by no means least, giving the administrative council and the officers and our commissioner and secretary of the association the loyal support of our membership. By these means, gentlemen, the work of this association can go forward, and it can be even a more powerful and efficient agent for industrial peace in our foundries in times to come than it has been in the past."

Constitutional Amendments.

A number of amendments to the constitution and by-laws of the association were presented to the convention. They are the recommendation of a special committee, consisting of F. T. Towne, P. W. Gates and Geo. Q. Thornton. A two-thirds vote being necessary for their adoption, they will be submitted by letter ballot. In many cases the changes proposed are slight. One amendment provides that "no member shall be entitled to financial benefits of membership in the settlement of any difficulty which may arise between him and his workmen before he shall have been a member of the association for a period of two months." Another provides for a commissioner, to be appointed by the president, with the approval of the Administration Council. He is to take charge of the executive work of the association.

Growing out of the appointment of the commissioner a change in practice is provided for in the following amendment, which relieves district committees of the active conduct of cases of dispute:

"In case any difficulty shall arise between a member of this association and his employes, he shall immediately notify the commissioner, giving full details of the case for the information of the association, and in order that the commissioner may assist and direct, in person or otherwise, in effecting a settlement which shall be satisfactory to the member involved, and without prejudice to the interests of other members of the association.

"It shall be the duty of the commissioner or his representative to give prompt attention to the matter in dispute and in pursuance of such action to consult without unnecessary delay the district committee or other local representatives of the association which may from time to time be appointed.

"No adjustment of any such difficulty shall be made by the commissioner or by the member involved which shall not be in full conformity with any and all agreements and obligations which may be binding upon the association at the time of such adjustment.

"Should the commissioner, in co-operation with the member involved, be unsuccessful in settling within a reasonable time the difficulty in question, the commissioner shall take such other action, under the direction of the president, as may be prescribed by the Administrative Council."

In the following paragraphs the only amendment consists in inserting the words "in its discretion" in each.

"The Administrative Council, in its discretion, may also use the reserve fund as well as the other funds to provide police and other protection for the member, his property and the men in his employ, and to pay expenses for the prosecution of men unlawfully interfering with the member in the conduct of his business, whether by personal assaults, destruction of his property or otherwise."

"The Administrative Council, in its discretion, may refuse to give the aid of the association in any case where the member involved has failed to promptly advise the commissioner of the existence and nature of the difficulty in question, in accordance with section 1 of this article. It may also refuse aid in cases where the member involved has refused or failed to comply with the advice and suggestions of the president or the commissioner."

Incorporation of Trade Unions.

The question of incorporation of trades unions came up in connection with the consideration of the relations of the National Founders' Association and the Iron Molders' Union. There were some expressions in favor of making the incorporation of the molders' union or of locals a condition of entering into contracts. Another proposition was that bonds be given both by foundrymen and the local unions for the faithful performance of contracts entered into. It appeared from the discussion that the legal questions involved were such as to make this ground upon which neither side could tread with certainty, and no action was taken. The discussion was significant, however, of the strong feeling among manufacturers that wage agreements are not now sufficiently binding on the employes.

A Foundry Training School.

Not a little interest was shown in the proposal brought before the convention for the establishment of a training foundry, in which, under the direction of members of the association, young men might be taught the trade of molding and be prepared to take such positions as might be assigned them under the direction of the association, when they had become skilled.

National Metal Trades Association.

Ernest F. DuBrul, of Cincinnati, first vice president and commissioner of the National Metal Trades Association, addressed the convention briefly in its closing session. He referred to the fact that 40 members of the N. M. T. A. are also members of the N. F. A., while many more members of the latter are eligible to membership in the association of the metal trades. As bearing upon the proposal for a national agreement between founders and molders, he said that the one great mistake of the National Metal Trades Association

was in making an agreement with the machinists' union. While that agreement contained important concessions from the machinists, it was evidently never the intention of the union's officers that the agreement should be kept. The past 18 months had sifted the membership of the N. M. T. A. and today its membership was tried and seasoned, so that the association knew just what it could depend upon. The low point has been passed and now the association was on the up grade in strength and membership. The speaker said that conditions in Chicago, in both the foundry and machinery trades, would show a vastly different complexion today had there been in existence 10 years ago such an organization as the National Founders' Association or the National Metal Trades Association. Employers had themselves to blame in many instances for the unjust exactions to which they were subject. Intelligent, united action on the lines now being followed would free American industry from some of its handicaps.

The usual votes of thanks were registered by the association just before adjourning sine die. The Detroit foundrymen were especially thanked for the entertainment given the visitors the night before in a "smoker" at the Cadillac. It was voted on all hands one of the most successful conventions of the association and one giving largest promise of results.

Antonio C. Pessano, of Detroit, was honored in one of the resolutions passed at the final session. It directed that in any conference that might be held looking toward a national agreement with the Iron Molders' Union, Mr. Pessano be one of the conferees.

The New Officers.

Fred T. Towne, the new president of the National Founders' Association, like his predecessor is one of the youngest members of that organization. His technical education was obtained at the Massachusetts Institute of Technology. On completing his course he entered the employ of the Yale & Towne Mfg. Co. and is now general superintendent of that company's Stamford and Branford, Conn., plants, in which are employed 3,000 men. Mr. Towne has been a member of the administrative council of the National Founders' Association from its first year and has attended all its meetings and had a hand in formulating its policy. He is a member of the American Society of Mechanical Engineers.

Isaac W. Frank, of Pittsburg, the new vice president, was graduated from the Troy Polytechnic Institute in 1877 and for several years was engaged in railroad engineering. He later entered the employment of the Bethlehem Steel Co., South Bethlehem, Pa., and in 1880 became connected with the Lewis Foundry & Machine Co., builder of rolling mill machinery at Pittsburg, Pa. In 1891 the Frank-Kneeland Machine Co. was organized and a large plant was erected on the Allegheny river at the foot of 54th St. on the Allegheny Valley Railroad. When the United Engineering & Foundry Co. was organized with a capitalization of $5,500,000, Mr. Frank was elected its president. This company absorbed the plants of the Frank-Kneeland Machine Co., Lincoln Foundry Co., and McGill & Co., of Pittsburg, and the Lloyd Booth Co., of Youngstown, O., and the Chilled Roll Foundry Co., of Apollo, Pa., was later taken in.

John R. Russel, the association's treasurer for the past three terms, and the only member considered in connection with that office, in spite of his earnest request to be relieved, is secretary of the Russel Wheel & Foundry Co., of Detroit. He took a college course at the University of Michigan, Ann Arbor, Mich., and afterward took his degree in medicine there. But a business career had more attractions and on graduation he started as a molder's helper in the works of his brother, who shortly before had started the Russel Wheel & Foundry Co. Mr. Russel has been secretary and treasurer of the company for a number of years, and is associated with W. S. Russel in its management. He is also secretary and treasurer of the Great Lakes Engineering Works, Detroit.

Antonio C. Pessano, president and general manager of the Great Lakes Engineering Works, Detroit, was singled out by the convention of last week for membership on any conference committee that might be named by the Administrative Council in the coming year to meet the Iron Molders' Union.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

The New York convention of the American Society of Mechanical Engineers will be opened at 8:30 p. m. on Tuesday, Dec. 2, at the society's parlors, and as the president of the society, Edwin H. Reynolds, is ill and unabe to be present, the paper by Sidney A. Reeve on "A Rational Solution of the Problem of Weights and Measures," will be taken up for discussion. The Wednesday following will open with a business meeting, which will be held in more commodious quarters at the Sturtevant House at the corner of Broadway and 29th St. The reports of the council, tellers and committees will be presented. Action on the proposed amenments to the rules will be taken up at this session. Until the hour of adjournment after the executive business has been concluded professional papers will be taken up as follows: "The Metric System," by F. A. Halsey; "Entropy Analysis of the Otto Cycle," by S. A. Reeve. The session of Wednesday evening will be held at the Sturtevant House at 8:15 and papers will be read as follows: "Apparatus for Obtaining a Continuous Record of the Position of an Engine Governor," by J. C. Riley; "Fly Wheel Capacity for Engine-Driven Alternators," by W. I. Slichter; "Heat Resistance the Reciprocal of Heat Conductivity," by Wm. Kent.

The presentation of these papers will be followed by topical discussions on "Smoke Consumption," "Elastic Resistance," "Oil Burners," "Oil Separation from Steam," and "Oil Tempering of Steel."

The fourth session will be held on Thursday at the Sturtevant House at 10 A. M. and papers will be taken up as follows: "A Forty-four-Foot Pit Lathe," by J. M. Barnay; "Finer Screw Threads," by Chas. T. Porter; "A Surveying Instrument in the Machine Shop," by C. C. Tyler; "Gift Propositions for Paying Workmen," by Frank Richards; "Deflections of Beams by Graphics," by W. Trinks.

For Thursday afternoon it has been arranged that the stations of the Interurban Street Railway Co. at 93d street, the Manhattan Elevated Railway Co. at 74th St., and the Waterside Station of the New York Edison Co. at 38th St. shall be open to members, and the Interurban Street Railway Co has offered to furnish free transportation for the members and guests to and between stations for the afternoon. There will be a reception and conversazione at Sherry's on 44th St. and 5th Ave. on Thursday evening at 9 o'clock.

The reading of professional papers will be resumed at the closing session on Friday morning at 10:30, when the following will be presented: "Rotary Pumps," by J. T. Wilkin; "Filing System for Office Use," by H. M. Lane; "Analysis of Commercial Value of Water Power, per Horsepower per Annum," by A. F. Nagle; "Centrifugal Machines," by B. Viola; "Oil-Testing Machine and Results," by A. Kingsbury.

Saratoga is being considered as a probable place for the spring meeting of 1903.

At the joint convention of the National Hardware Assotion and the American Hardware Manufacturers' Association, held last week at New Orleans, La., officers were elected as follows: National Hardware Association—President, R. A. Kirk, St. Paul; first vice president, John C. Knock, Milwaukee; second vice president, Bruce Hayden, San Francisco; secretary-treasurer, T. James Fernley, Philadelphia. The officers of the American Hardware Manufacturers' Association are: President, Fayette Plumb, Philadelphia; first vice president, S. Krelinger, Fort Madison, Ia.; second vice president, J. B. Birgem, St. Louis; third vice president, George W. Corbin, West Park, O.; secretary-treasurer, F. D. Mitchell. Executive committee—Robert Garland, Pittsburg, chairman; Henry B. Lupton, Pittsburg; N. A. Gladding, Indianapolis; W. S. McKinney, Allegheny; H. C. Holt, Cleveland; F. L. Clark, Birmingham, Ala.; G. W. Landers, New Britain, Conn.

Maurice J. Hickey, aged 63 years, and for the past 30 years assistant manager of the Howe-Brown plant of the Crucible Steel Co. of America, died at his home, Pittsburg, Pa., on Saturday afternoon, November 22. He is survived by his wife and eight children.

Union Steel Co. and Sharon Steel Co. Merged.

A consolidation of the Union Steel Co., of Pittsburg, and the Sharon Steel Co., of South Sharon, Pa., was effected last week and the new company will be known as the Union Steel Co. The capital stock authorized is $50,000,000, of which $33,000,000 will be issued immediately to cover the purchase of the properties and to complete new operations now under way. The additional $17,000,000 of stock will be issued at some future time for the purpose of building a railroad from Lake Erie to connect with the plants at South Sharon and Donora, Pa. Only one class of stock will be issued and the promoters state that it is their present purpose to withhold the stock from the market. In addition to the securities noted above the new company will carry $3,591,000 worth of 5 percent bonds, payable in 1940, which have been issued on certain of the properties of the Sharon Steel Co.

This consolidation may represent the first step in the consolidation of some of the larger independent steel interests. While the negotiations were pending it was rumored that the Jones & Laughlin Steel Co., of Pittsburg, would be included, although it is denied by officials of the latter concern that any plans in that direction had been considered.

The Sharon Steel Co. was organized Oct. 2, 1899, under the laws of Pennsylvania with a capitalization of $5,000,000. This was increased this year to $6,000,000 and the first installment on the additional issue of stock was paid last August. Bonds to the amount of $3,750,000 carrying 5 percent interest have been issued from time to time as follows: $2,000,000 on the properties of the Sharon Steel Co.; $500,000 by the Sharon Sheet Steel Co. and $1,250,000 by the Sharon Coke Co. Of the $2,000,000 bond issue on the general equipment $159,000 have been retired leaving outstanding $3,591,000. Before the merger it was the intention to make another bond issue on the properties of the Sharon Ore & Furnace Co., recently incorporated, which was to own and operate one blast furnace under erection at South Sharon, Pa., and a second furnace that is projected, making three furnaces in all at this plant. It was also proposed that this company own and operate all the ore properties of the company. However, since the consolidation it has not been definitely decided whether additional bonds will be issued or the identity of this underlying company retained. The various interests of the Sharon Steel Co. are as follows:

Sharon Coal & Limestone Co., $200,000 capital, of which two-thirds of the stock issue is owned and controlled by the parent company.

Sharon Coke Co., $2,500,000 capital, all owned by the parent company.

Sharon Ore Co., $200,000 capital, all stock owned by parent company.

Sharon Sheet Steel Co., capital $500,000, all owned by parent company.

Sharon Tin Plate Co., $800,000 capital, 60 percent owned by parent company and 40 percent by outsiders.

Sharon Steel Tube Co., $1,000,000 capital, all owned by parent company.

The total amount of stock of these various companies held outside of the parent company amounts to $386,667. For each of the 60,000 shares of the Sharon Steel Co. the new company will give two and two-thirds shares of its stock issue which will be equivalent to paying $14,000,000 for the properties of the Sharon Steel Co., in addition to taking over the bonded debt. Recently stock of the Sharon Steel Co. was quoted at $175 per share, but on the basis that the stock has been taken over there is an increase in the market value of the securities of $91.67.

The Union Steel Co. was organized in May, 1900, with a nominal capitalization of $1,000,000. This by no means represents the expenditures of the company, and while the stock issue has not been increased, the stockholders have paid in large sums of money from time to time for the erection of plants and to purchase coal and ore properties. The Donora Mining Co., with only a nominal capitalization, is the only subsidiary company of the Union Steel Co. and owns and controls ore properties in addition to two ore carrying vessels which were recently acquired. On the basis of the capitalization of the new company the value of the properties of the Union Steel Co. will be represented by about $19,000,000 of the capital of the new company, which the promoters of the latter consider a conservative basis considering the value of the properties that are taken over.

Properties of the Two Companies.

The properties of the Sharon Steel Co. are as follows:

Four hundred acres of land at South Sharon, Pa., upon which the company's mills and blast furnaces are located.

One 600-ton blast furnace which has been in operation for more than a year; one 350-ton furnace which is well under way and which will be blown in in the spring. A third furnace with a daily capacity of 350 tons will be built as soon as the necessary filling can be completed. This stack will be in line with the other two. When in full operation these three furnaces will have an annual output of 400,000 tons.

Twelve 50-ton open-hearth steel furnaces with a total annual capacity of 350,000 tons.

Blooming, billet and sheet bar mills to roll down the steel ingots.

Two wire rod mills with an annual capacity of 125,000 tons. Wire drawing plant, wire nail and other subsidiary wire working plants.

Merchant steel pipe plant which will be placed in operation about the first of the year, with an annual capacity of 125,000 tons.

Twenty tin mills together with tinning house and all necessary cold rolling mills. The output of this plant has been contracted for by the American Tin Plate Co. for a period of five years and is therefore not placed on the market through the Sharon Tin Plate Co.

Fourteen sheet mills. This plant is nearing completion and it is probable that it will be placed in operation shortly after the first of the year.

The Sharon Coke Co. has under erection 212 Otto-Hoffman retort ovens the first of which will be placed in operation shortly after the first of the year. This plant will have a daily output of about 1,300 tons of coke and will be sufficient to supply the three furnaces when they are in operation.

The Sharon Coal & Limestone Co. owns 9,000 acres of coal and limestone property in Mercer County, Pa., only a short haul from the Sharon plant. In addition 1,500 acres of coking coal land is owned at Masontown, Fayette County, Pa.

Extensive ore properties on the Mesabi range, at Buhl City, Minn., are also owned, which are estimated to contain upwards of 21,000,000 tons of ore.

The plant of the Union Steel Co. is located at Donora, Pa., on the Monongahela River only a short distance from Pittsburg. The present equipment consists of two wire rod mills with an annual output of 200,000 tons; wire drawing equipment and nail machinery for producing 1,000,000 kegs of nails annually. Two 600-ton blast furnaces are under erection, which will be completed in the summer next year and which will have an annual output of about 400,000 tons. Twelve 60-ton open-hearth steel furnaces will be completed next May and will have an annual capacity of about 400,000 tons.

The Donora Mining Co., a subsidiary company of the Union Steel Co., owns and controls ore properties in the Lake Superior region representing about 20,000,000 tons of ore. In addition two vessels were recently purchased for the purpose of carrying the ore from the mines to Lake Erie ports. The company also owns 3,000 acres of coking coal land in Fayette County, Pa.

The combined companies will have an annual output of pig iron amounting to 800,000 tons and an output of about 750,000 tons of steel, all of which will be carried through to the finished state and marketed as sheets, tin plate, merchant pipe and tubing, wire and wire nails.

Since the plant of the Union Steel Co. has been in operation it has secured all of its steel from the Carnegie Steel Co. on a favorable contract, the price of the billets being on a sliding scale, making it at present considerably below the market price of billets. In this way large profits have been made during the past year and a half and the contract has several years to run. The Sharon Steel Co., on the other hand, has a favorable contract for the output of a blast fur-

nace. This does not expire until 1904, when its third furnace will no doubt be in full operation.

The new Union Steel Co. has been temporarily organized by the election of A. W. Mellon, formerly vice president of the Union Steel Co., of Pittsburg, as president; W. H. Donner, president of the Union Steel Co., and John Stevenson, Jr., vice president and general manager of the Sharon Steel Co., as vice presidents, and William Flinn, chairman of the executive committee. The remaining officers have not yet been selected, but it is probable that they will be before the end of the week. The Sharon Steel Co. has had the following organization: George W. Darr, president; John Stevenson, Jr., vice president, and D. Adams, treasurer. The board of directors consisted of John Stevenson, Jr., J. P. Whitla, John Fahnline, W. H. Lewis, William Flinn, George H. Flinn, John K. Bryden, Peter Shields and George W. Darr. The organization of the Union Steel Co. was as follows: W. H. Donner, president; A. W. Mellon, vice president; R. B. Mellon, treasurer, and S. H. Waddell, secretary. The officials comprised the board of directors.

The consolidation of these two companies will no doubt have the effect of steadying the wire nail and wire market which has been suffering more or less of late from keen competition and price cutting. It is also interesting to note that the lines manufactured by the consolidation, namely, wire, wire nails, merchant pipe and tubing, sheets and tin plate are the ones which have suffered from recent reductions, the producing capacity of the country evidently being entirely too great for the demand. The promoters claim that by the consolidation the companies will be in a better position than ever before to meet market conditions and having control of raw material will be well able to meet the competition of the companies of the United States Steel Corporation. It is stated on reliable authority that the tenure of A. W. Mellon as president of the consolidation is only temporary and it is probable that an outsider, connected with the steel business in Pittsburg for many years, will be elected to fill this position.

The Steel Corporation's Extension Plan.

In reply to a statement that the extension plans of the United States Steel Corporation would be abandoned in the event of a adverse decision on the bond conversion plan, a representative of the corporation said: "The big surplus of the corporation, with assurances that earnings will continue large for at least two years—it is unsafe to make predictions beyond that time—justifies the corporation in going ahead with its improvements and additions notwithstanding what action the courts may take. The fact is we have already got so far along with our extension plans that it would be folly for us to abandon them should the bond-conversion plan fall through. We have already started our new bridge plant, completed our plans looking to an extension of our tube mills in McKeesport, and made other expenditures. The additional ground necessary for the McKeesport extensions has already been purchased. We believe it will be to the interest of the company to meet the expense involved in these extensions through the sale of additional bonds. It would not be good policy to put all our surplus into extensions. Consequently, I believe, in the event of an unfavorable decision by the courts, the extension plans will be carried over a longer period. That is, if we should decide not to issue $50,000,000 additional bonds, which we have a right to do even if the courts should render a decision against the conversion of $200,000,000 of stock into bonds."

The Brass Founders Supply Co., of 20 Prospect St., Newark, N. J., announces that it now has in operation the new foundry at 451-473 Riverside Ave., which required to be added to the plant, owing to the increased demand for the company's product. The foundries are commodious and are equipped with traveling cranes and all modern appliances. Besides making its own castings the company has prepaired to make a general line to order of iron castings, from 1 ounce to 4 tons.

The Lodi Steel Box Co. has moved its plant from Lodi, O., to Defiance, O. Local merchants of Defiance subscribed $3,000 and presented it to the company.

PACIFIC STEEL & WIRE CO.

An important development on the Pacific Coast is the recent incorporation of the Pacific Steel & Wire Co., with headquarters in San Francisco, and the taking on by this company of the business of the De Kalb Fence Co. and the Union Fence Co., which have been in successful operation on the coast for some years. The company has also purchased about twenty-five acres of land on Oakland Harbor at the 23rd Avenue Station, East Oakland, and adjoining the property of the California Cotton Mills. The site selected has a frontage of nearly a thousand feet on the main line of the Southern Pacific Railroad, and over 1,500 feet water frontage on Oakland Harbor, thus giving the company excellent shipping facilities by rail and water. The location selected is also convenient to the street car lines of the Realty Syndicate in Oakland, insuring accessible homes for the workmen.

The stockholders of the Pacific Steel & Wire Co. include some of the most prominent business men on the Pacific Coast. Among them are D. O. Mills, H. E. Huntington, I. W. Hellman, president of the Nevada National Bank; Ant. Borel, of Ant. Borel & Co.; Percy T. Morgan, president of the California Wire Association; Frank M. Smith, president of the Pacific Coast Borax Co.; Lewis E. Spear, formerly of Lewis Spear Co.; John Rosenfeld Sons' Co., and W. H. Talbot, of Pope & Talbot. The charter of the company is a very broad one, covering all manufacturing operations. The immediate purpose of the corporation, however, is to manufacture only the fine art steel and wire specialties, for which there is a great and growing demand in the Pacific Coast States, with the prospect of a large export business with the islands and countries of the Pacific that can be advantageously reached from San Francisco.

The company has strengthened its position by making connections with the new and modern plants of the National Steel & Wire Co. at New Haven, Conn., to supply the Atlantic Coast sections and export trade from that coast, and of the De Kalb Fence Co. and Union Fence Co., at De Kalb, Ill., to supply the Middle West and Northwest and Southwest sections. Special advantages will be secured also in the matter of steel supply. The plants of the company embody all latest mechanical devices for economical manufacture, while their location is advantageous for quick and cheap distribution to all parts of the United States and for reaching the export trade, this being the only company in its line of manufacture having plants at tide water on both the Atlantic and Pacific Coasts.

The executive offices of the Pacific Steel & Wire Co. will be in the Mills Building, San Francisco, and its warehouse will be temporarily at 154 First St., the store formerly occupied by the DeKalb Fence Co. and Union Fence Co., the business of the latter being hereafter conducted by the Pacific Steel & Wire Co. The management will be in the hands of practical men, who have had many years' experience in the business with the Washburn & Moen Mfg. Co.

The establishment of this plant on the Pacific Coast is another indication of the growth of manufacture in California and an earnest effort to develop the export trade of the countries of the Pacific, as well as build up the resources of the Pacific Coast by affording a home market for its products. Large inducements were offered by other cities to secure the location of the wire plant elsewhere, but the location selected is considered the best on the Pacific Coast in point of rail and water facilities, superior climate, and sufficient ground for the building of additional facilities as the growth of trade justifies. Albert Sutton, architect, has prepared the plans and work on the first building, an assembling or specialty plant, will commence immediately. This part of the factory will be in successful operation by Feby. 1. The officers of the company are Frank L. Brown, general manager; Frederic W. Hall, vice president and general counsel; Lewis E. Spear, treasurer. Mr. Brown is vice president and treasurer of the National Steel & Wire Co., operating the New Haven plant, the incorporation of which under Maine laws and its acquisition of the two DeKalb, Ill., wire fence companies, have already been detailed in these columns.

The McKinley and Raney stacks of the National Steel Co., at New Castle, Pa., were blown out last week on account of the shortage of coke.

THE TIPPETT SAFETY VALVE.

The inventor of the Tippett compact safety valve had as the starting point of his design a method of positively holding the main valve to the seat at such times as it was not intended to be in operation and thus resist the tendency to leakage at high pressures. The average safety valve, at the point when the pressure is approaching the popping stage, is balanced by steam pressure on the one side and the retaining spring on the other, whilst to hold the main valve in position with a uniform pressure the force pressing it to the seat should increase with the rising pressure until the release point is reached. With this latter object in view, the designer has arranged the adjusting valve to operate with a very light spring in order to ensure an exact and unvarying adjustment, and the operation of the main valve is at the same time exclusively controlled by the boiler pressure itself.

The valve in question is illustrated in the halftone, Fig. 1, and a sectional elevation, Fig. 2, shows the interior mechanism. The iron body or chamber of the valve is seen at A and this is surmounted by a cover B. The lever C swivels in a sleeve D and presses upon the end of a rod which in turn acts upon a washer and the spring. The lever C allows the pressure to be released by means of the cam face without resetting the valve, for the purpose of blowing off the pressure, for making repairs, washing out, etc., and this is done by relieving the slight tension of the small spring instead of increasing the tension of a large spring already under an excessive pressure. The part E is a strongly ribbed casting which extends into the body A, and is retained in place by a threaded connection. A similar fitting is inserted in the upper portion of E, and this continues upwards through the cover B.

FIG. 1.—THE TIPPETT COMPACT SAFETY VALVE.

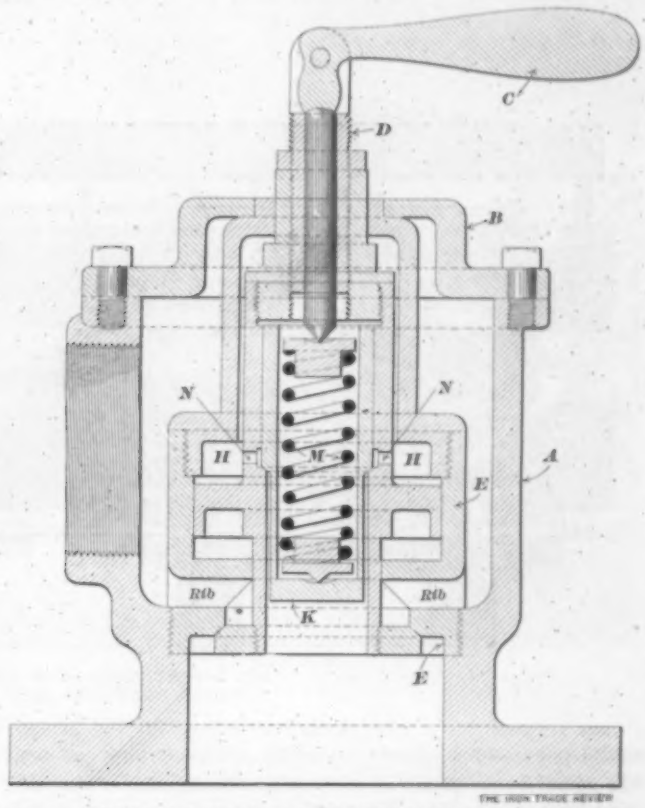


FIG. 2.—SECTIONAL ELEVATION OF TIPPETT COMPACT SAFETY VALVE.

The steam presses against the lower end of the adjusting valve K, which is held against its seat by the tension of the spring M, the latter being set to the required pressure. When the critical point is reached, the valve K is forced upward, allowing the steam to escape through the ports N N into the chamber H and here the steam exerts pressure on the top of the main valve. The main valve, as will be noticed, has a larger area in contact with the steam in the chamber H than is found on the under side of the valve which projects into the boiler, and this allows of a differential action, which permits a prompt opening as soon as the adjusting valve K operates.

When the pressure in the boiler decreases to such an extent that the spring M closes the adjusting valve K then the steam coming through the ports N N is shut off and the main valve at once closes by the boiler pressure. The large opening of the main valve prevents any increase of pressure over the popping point and the amount of valve opening is not limited by tension of the large spring found in common use. For this reason a 6-inch valve has very nearly 9½ square inches of effective area.

These valves are made in a variety of sizes from 2 to 6 inches, for boilers of from 35 to 300 h. p., by the N. L. Hayden Mfg. Co., of Columbus, O.

There is great activity in railroad construction now. The Seaboard Air Line has several large forces at work on the extension of its East & West line from Coal City to Birmingham; the Louisville & Nashville is going ahead with its spur line from a point about 10 miles north of the city to Linn's Crossing, some 25 miles northwest of here, opening up some valuable coal lands. The Eastern Railway of Alabama is making rapid progress in building from the Alabama Mineral Division of the L. & N. at a point near Talladega to Pyriton in Clay County. This line will open a fine territory, covered with virgin pine timber and containing considerable deposits of brown iron ore and pyrites. There is some talk of the Seaboard Air Line building to Gadsden from a point near Coal City, but it is not very generally believed this will be done, although Gadsden seems to have bright prospects for railroad tonnage. The Alabama Steel & Wire Co. has begun active operations on the property recently acquired there, and it is now claimed that the interests which recently bought the properties of the Southern Car & Foundry Co. will erect their steel car plant at Gadsden instead of locating at Ensley as proposed some time since.

The Bethlehem Steel Co. has received orders for the billets for the Hershoff Mfg. Co. and for the plates, sheets and angles for the new cup defender. These billets are made out of the company's standard grade of open-hearth nickel steel, and will be delivered to the different rolling mills to roll into shape.

The American Steel Foundries has declared the first quarterly dividends of 1½ percent on the preferred stock. The company has outstanding $30,500,000 stock, of which $15,000,000 is common and $15,500,000 preferred.

THE KOERTING GAS ENGINE.

The Koerting gas engine designed by Ernest Koerting, and built in this country by the De La Vergne Refrigerating Machine Co., of New York, is of the double-acting, two-cycle type, and is the result of a series of tests and experiments extending over a period of nearly five years, these trials having been conducted on models and a 400-h. p. gas engine built in the Koerting shops. The method of operation is as follows: The engine is double-acting like the ordinary steam engine and the crank end therefore is similar to the head end of the power cylinder. The admission valves are located in the valve boxes, which are bolted to the cylinder heads. There are no exhaust valves required, as the products of combustion escape through slots or ports cast in the middle of the cylinder from whence the exhaust pipe leads. These slots are covered by the motor piston itself and for this purpose the piston is made very long and is packed at each end by the customary self closing spring rings.

The combustible mixture is admitted through two double acting auxiliary pumps, the one for gas and the other for air. These pumps are so proportioned that their combined action always secures the proper mixture necessary for the perfect combustion and introduces the product to the working cylinder. The compression spaces of the pumps are divided so that the crank ends of the air pump and gas pump discharge into the crank end of the power cylinder and the head ends of the pumps discharge into the head end of the power cylinder. The air and gas are compressed by means of the pumps to about nine pounds to the square inch.

It will be seen on reference to the plan view shown in Fig. 1 that the piston is at the outer dead point and that the exhaust ports are exposed toward the opposite or head end of the engine. The instant the piston begins to uncover the exhaust ports the pressure of the residual products of combustion in the cylinder drops rapidly to that of the atmosphere. When this has taken place the inlet valve is opened and a fresh charge is admitted by the pumps. The valve gear is so designed that air only is supplied first to separate the burnt gases from the succeeding mixture and afterwards gas and air, mixed in proper proportions.

The combustible mixture of gas and air is produced only at the inlet to the cylinder. There is no storing of it and this represents a considerable advantage over engines that keep more or less of the combustible mixture outside of the working cylinder. There is a suitable design of the admission device with a view to prevent the mingling of the air first introduced with the burnt residual gases or with the succeeding charge of the combustible mixture.

Shortly after the exhaust ports are again opened by the receding piston, the gas and air pump pistons arrive at their dead point position and the supply of mixture is interrupted. The inlet valve closes and the charge is compressed in the cylinder in the usual method until at the dead point of the stroke ignition takes place. At the next movement of the main piston the ignited charge exerts its driving power by expanding to a stage immediately before reaching the other dead points, when the piston uncovers the exhaust ports again and allows the consumed charge to be blown out. On the opposite side of the piston the same operation takes place.

In order to secure the separating layer of air already referred to, between the hot consumed gases and the fresh charge, the gas pump is so constructed that no gas is delivered until after a certain point in its compression stroke. The pump is provided with piston valves with the valve gear so arranged that its maximum capacity cannot exceed 50 to 60 percent of its total displacement. After the pump has completed the suction stroke the gas suction port is left open during a portion of the succeeding (compression) stroke, so that the gas can return without increase in pressure until the suction port is closed, when the gas is compressed and passed out through the compression port. The amount of gas thus furnished corresponds to the maximum power of the engine.

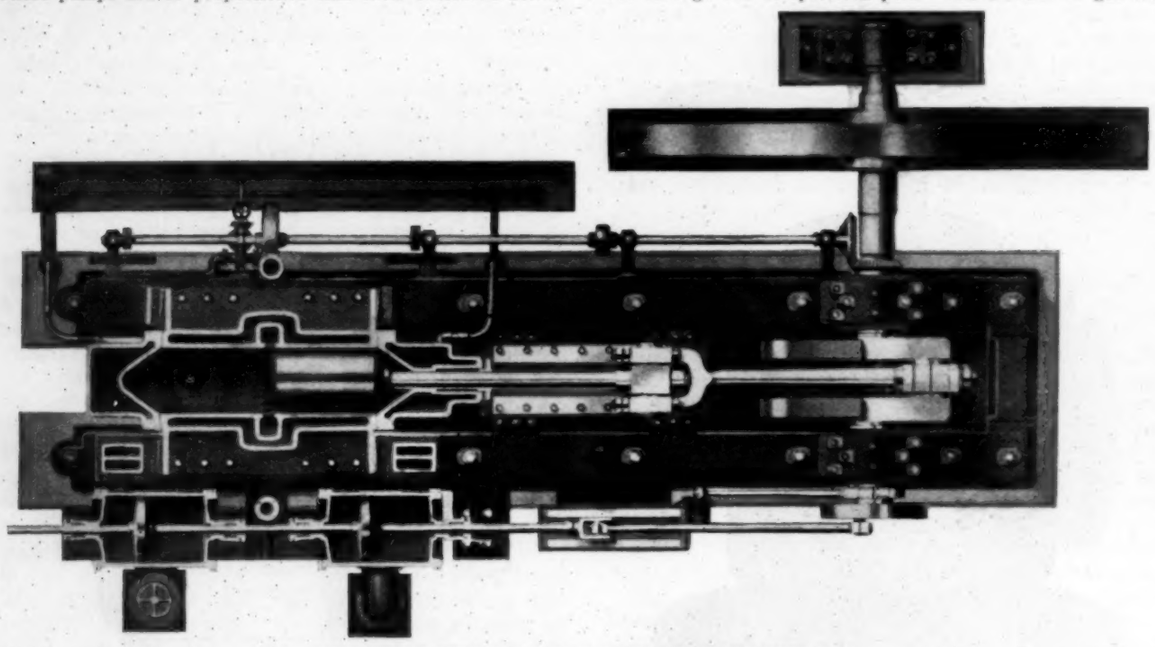


FIG. 1.—SECTIONAL PLAN VIEW OF THE KOERTING ENGINE.

Regulation of the power is effected as follows: When the load on the engine is reduced, the gas pump commences to furnish gas at a correspondingly later period, thus discharging a diminished quantity of gas into the working cylinder. This is accomplished either by the valve gear of the pump and controlled by the governor, or by a bypass located between each pump end and the respective compression channel which leads to the inlet valve on the main cylinder. The throttling device in this bypass is also under the control of the governor.

It is evident from the above description that the engine operates with a variable amount of mixture and that correspondingly more or less air is sent first into the power cylinder. This air stays near the middle of the cylinder, while the combustible mixture remains at the heads of cylinder close to the inlet valves and igniters. The peculiar shape of the cylinder heads prevents the mingling of the layer of air with the following mixture of gas and air.

Two spark coils are provided at each end of the power cylinder for ignition purposes. These are operated by a separate shaft driven by spur gearing from the cam shaft. The gear on the igniter shaft is not rigidly connected but is coupled with a sleeve having a feather which is set spirally around the shaft so that by a sliding movement of the wheel the igniter shaft may be set behind or in advance of the cam shaft. In this manner the time of ignition may be changed during the

running of the engine to suit whatever kind of gas is being used. A further advantage secured by this arrangement is that at starting the point of ignition may be so adjusted that explosion takes place only after the piston has passed the dead point and the engine starts very slowly without incurring any pre-ignition. Very lean gases require much earlier ignition than is otherwise usual and the ignition of poor gas mixtures is said to present no difficulties with this arrangement. In practice, indicator cards are taken from time to time to check the timing of the ignition and to see whether the combustion of the gas is without fault.

The engine is started with compressed air. Engines to which a blowing cylinder is attached are easily started with air under 150 pounds pressure and for those without such cylinders 90 to 120 pounds per square inch is sufficient. This circumstance is of much importance, as the air pressure does not exceed the amount of compression under which the engine runs, namely 150 to 175 pounds. No compressed air can enter near the dead point position where compression of the mixture is at a maximum, and so the ignition can take place without being unfavorably influenced by such air which is thus automatically cut out. A piston valve is provided for admitting the compressed air at front and back ends of the cylinder as in a slide valve engine. This piston valve is operated from the cam shaft by an eccentric, which can be readily thrown into or out of gear. Filling the cylinder with air twice is usually sufficient for starting up, after which the engine is automatic.

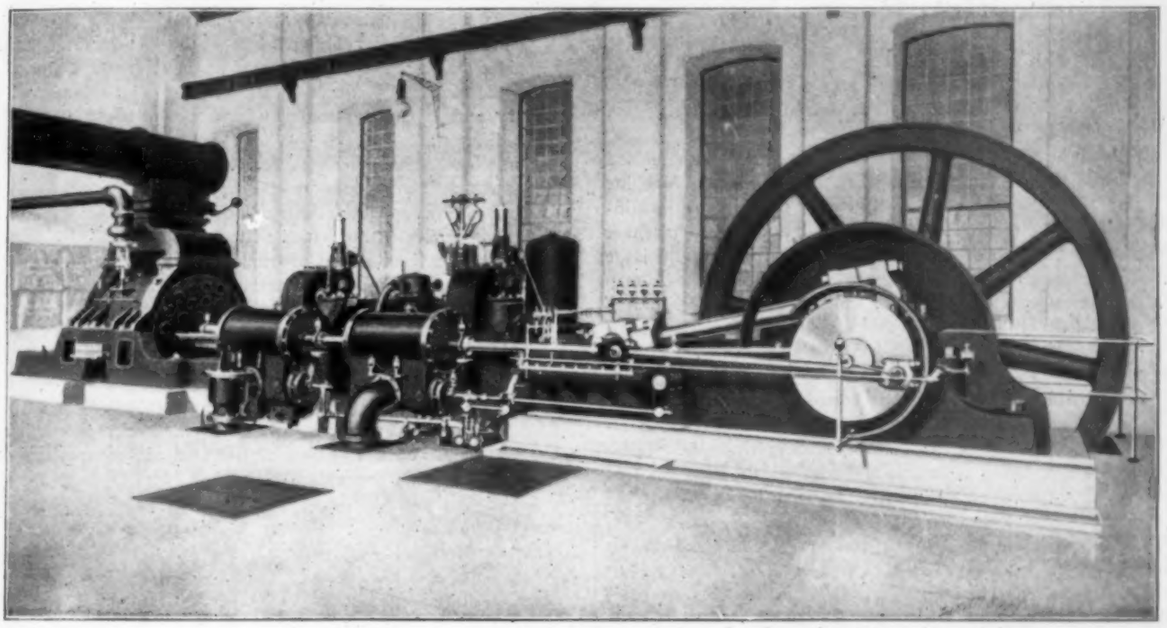


FIG. 2.—THE KOERTING ENGINE WITH BLOWER IN TANDEM.

The power cylinder and piston are cooled by circulating water, which in the case of the piston enters the tube carried through the crosshead pin and the hollow piston rod, and returns the same way but on the outside of the tube. The stuffing boxes in the cylinder heads are surrounded by water and the cylinder walls also are cooled throughout except at the middle where the exhaust slots are located.

The cylinder is equipped with relief valves which serve also as safety valves, and hand hole plates are provided for cleaning the exhaust ports. Experience has shown, however, that the inside of the cylinder remains very clean; even after continuous running the exhaust ports especially remained perfectly clean, which is the result of the violent discharge of the burnt gases occurring alternately from left to right. Fig. 2 shows a combination of a Koerting engine driving a horizontal blower in tandem.

The De La Vergne Refrigerating Machine Co. has several thousand horsepower of the Koerting engines under construction for the Lackawanna Steel Co.'s plant at Buffalo, N. Y. They will be supplied with gas from the blast furnaces.

TRADE PUBLICATIONS.

The publishing department of the Westinghouse Companies, of Pittsburg, has produced a book entitled "Work Done," which will have a lively interest for those following the modern progress of engineering. The book is a 6x9 volume of a hundred pages devoted to the achievements of Westinghouse, Church, Kerr & Co. in the design and construction of several electric railroads as well as the plant of the American Car & Foundry Co. at Detroit. Each of these undertakings has been described and illustrated with much attention to the mechanical details of the subject and the result either from a typographical or an engineering point of view has been attained with a large measure of success. We understand that the volume is for gratuitous distribution.

A score of pages comprise a booklet treating of the high grade crucible steel handled by the firm of Edwin R. Kent & Co. (Ltd.) of Chicago. The pamphlet not only contains a most complete classification of the various sizes and kinds of air-hardened steel (including beveled air-hardened for cutting-off tools), high carbon steels, etc., but gives some carefully prepared instructions for working these materials. Magnet steel, "Turner's" patent iron fibred steel, sheet steel, mining drill steel, borer steel, etc., are enumerated with stock sizes, etc.

The Knecht sensitive friction drill is discussed in a neatly printed folder under the caption "You take no risks." This sensitive friction drill is manufactured by the Knecht Brothers Co., of Cincinnati, and a number of testimonials to its efficiency are given in the present publication.

The consolidation of the Putnam Machine Co. with the Putnam Tool Co. (S. W. Putnam Sons), of Fitchburg, Mass., has resulted in the development of one of the largest machine making plants and the catalogue now issued presents in 163 pages an extensive line of machinery. The book is freely illustrated with a good index and the peculiarities of the Putnam product are set forth at considerable length.

Catalogue No. 36 treats of electric travelers, cranes, etc., manufactured by the Whiting Foundry Equipment Co., of Chicago. The catalogue extends to 123 pages and is profusely illuminated by excellent halftones, many of these illustrations showing the cranes as installed and put into regular service. The publication is a neat specimen of two-color work and is altogether an admirable production.

"Jessop's steel, and how they make it," is the title of a

finely illustrated account of the plant and practice of this well known firm at the establishment in Sheffield, England. The story of steel manufacture is entertainingly told and the latest advances, particularly the progress in high duty tool steels, will be found of timely value.

The annual report of the sociological department of the Colorado Fuel & Iron Co., of Denver, Col., is a production of very general scope. It records the work of the department having a supervision over all matters pertaining to education and sanitary conditions; a work spread over an area containing 38 mining and coke camps, rolling mills at Laramie, Wyo., a vast steel plant at Pueblo, Col., and two railroads. The extensive field of operations is best shown by the fact that to make a tour of inspection requires six weeks' time and a trip of 3,600 miles. The report is an excellently illustrated document of much importance and is worthy of more detailed treatment than the limited space at our disposal will permit.

Some admirable halftones adorn the pages of the dainty catalogue devoted to the sensitive drill presses made by William Gardam & Son, of New York. The machines are manufactured for both bench and floor purposes.

A large catalogue of 64 8x11-inch pages is devoted to the Stewart gas blast furnaces, flexible shafts, etc., made by the Chicago Flexible Shaft Co., of Chicago. The furnaces are made with burners adapted to use different kinds of gas and need not be connected to the chimney. A number of useful attachments to the flexible shaft outfits are also described.

"A Modern Machine Shop Outfit" is the title of a standard size, 6x9 inches, pamphlet published by the Garvin Machine Co., of New York. It is not intended to give detailed information, as the company has covered the line of machine shop equipment by a series of catalogues, and the present issue of 56 pages is but a general treatment of the subject. A map of the convenient street railway connections is incorporated and this is timely in view of the forthcoming meeting of the A. S. M. E. and the probable advent of visitors to the Garvin shops.

Screw plates, taps and dies are treated in Catalogue No. 13 of the Western Tool Co., Lansing, Mich. The tools in question are especially designed for the blacksmith trade. These catalogues are being issued in a series as the best plan of keeping the publication up to date. Three are now out and the company expects to issue one every two weeks.

The Jeffrey Mfg. Co., of Columbus, O., has a new catalogue, No. 72, devoted to chain belting and steel cable, elevating and conveying machinery. The work extends to some 376 5½x7¾-inch pages, which are profusely illustrated with both line engravings and halftones, showing the construction of the machinery and some notable installations. A comprehensive index is a useful addition to the other excellent features.

Catalogue No. 12 supersedes all previous issues in relation to the Austin Separators manufactured by the Austin Separator Co., of Detroit, Mich. The company makes a line of live and exhaust steam separators which are illustrated in a variety of forms with complete dimensions and sizes.

Belt conveyors form the subject matter of the neat two-color circular of the Stephens-Adamson Mfg. Co., of Aurora, Ill. The several parts of the equipment are taken up for elaboration and shown with the aid of a number of high grade halftones.

M. H. Treadwell & Co., of New York, have sent a package of printed matter which comprises a catalogue of railroad car construction, circular of boiler fronts, engineers' firing tools, standard and narrow gauge car construction, railway material, furnace castings, the "Tread-Kill" improved shaking grate and dumping and shaking grate bars of every description. There is also a reprint from *The Iron Trade Review* of July 10, 1902, of an article on the hot metal cars built at the Lebanon, Pa., works of the company.

The Goheen Mfg. Co., of Canton, O., has an interesting little publication dealing with "Galvanum," a paint which will adhere to galvanized iron. A number of halftones illustrate the exacting service of this particular brand of paint, the field covering marine and architectural metal work.

The steel wagons manufactured by the Steel Wheel & Wagon Co., of Pueblo, Col., are described in an elaborately colored catalogue. The company manufactures steel wheels, steel wagons, steel gears and pressed steel wagon beds, which are treated with close attention to as near a reproduction of the actual appearance of the goods as typography will permit.

Three bulletins, Nos. 1, 7, and 28, discuss the direct current, direct connected generators, the direct current belt driven multipolar generators and motors and the inductor type of alternating current generators manufactured by the Electric Machinery Co., of Minneapolis, Minn. These machines are made in a variety of sizes for different grades of service and the story of the construction of the machine elements is a decidedly interesting one to the mechanic who endeavors to keep in touch with the progress of electrical equipment. The pamphlets are models of plain statement, clear printing and excellent reproductive process, a combination not any too common.

H. S. Vrooman, of Chicago, has a catalogue relative to foundry facings, foundry supplies, fire brick and molding sands. The different brands of facings, styles of equipment, etc., are enumerated at length, and there is a page of useful information devoted to fire brick, which in itself will do much to save the pamphlet from destruction.

"Grinders and Other Things," is the title of a trim, striking pamphlet published by the Ransom Mfg. Co., of Oshkosh, Wis. Catalogue "F" deals with grinding and polishing machinery and is an aggressive and successful effort at some thing different.

A number of changes have been made in the little catalogue, "Facts About Toolholders," prepared by the Hill Tool Co., of Anderson, Ind., and these will of necessity demand a discard of the old copies in the hands of those interested. No addition to the extensive line previously manufactured is to be noticed, however. The work treats of several styles of toolholders, lathe dogs, machine vises, crank turning devices, etc.

An essay on the development and usefulness of "Lubriphite" for high duty cylinder lubrication has been printed by the Lubriphite Co., of Jersey City, N. J. The lubricant is intended for cylinders using air, gas, oil, steam and superheated steam, and the printed matter is a vigorous recital of the merits of this particular lubricant.

A list of the weights and sizes of sections of shipbuilding material and patterns of chequer plates supplied by H. Ronnebeck, of Middlesbrough-on-Tees, England, has been brought up to date, and the 1902 edition has been received at this office. All the sections are represented in full size and the publication will be found to cover many useful shapes.

The Rosedale Foundry Co., of Allegheny, Pa., has consolidated with the Specialty Mfg. Co., of the same place, and the consolidated companies will hereafter be known as the Rosedale Foundry & Machine Co. Extensive improvements are now under way at the plant and the additions include a foundry and machine shop 90x432 feet and a power house 60x32 feet. As soon as the foundry and machine shop is completed the present plant of the Specialty Mfg. Co., on Frazier St., will be abandoned and the machinery will be installed in the new plant. The Specialty Mfg. Co. has made a specialty of heavy machine work for rolling mills and steel plants and the equipment for doing this work is to be greatly extended by the addition of a number of heavy machine tools. The new plant is to be operated by electricity entirely, each machine tool having its individual motor. One 40-ton cupola is also to be added to the foundry equipment which will increase the daily output of the foundry to 80 tons. The cost of the additions and improvements is estimated at about $150,000. The company is capitalized at $200,000. J. H. White is president; H. L. Irwin treasurer, and W. H. Hamilton secretary.

One of the Oxmoor furnaces owned by the Tennessee Coal, Iron & Railroad Co., at Oxmoor, Ala., has been blown in after an idleness of several years. Extensive repairs have been made and the output of the furnaces will no doubt be increased to 125 tons daily. The probabilities are that the second furnace of the group will also be repaired preparatory to placing it in operation shortly after the first of the year.

THE "RAPID" SKETCHING DEVICE.

The Rapid sketching device is built on the same lines as the Universal drafting machine already illustrated in these columns, the inventor, Mr. Charles Little, having modified his original design as used in regular drafting room practice for the purpose of producing a more portable instrument for less exacting service. The appliance permits of the production of

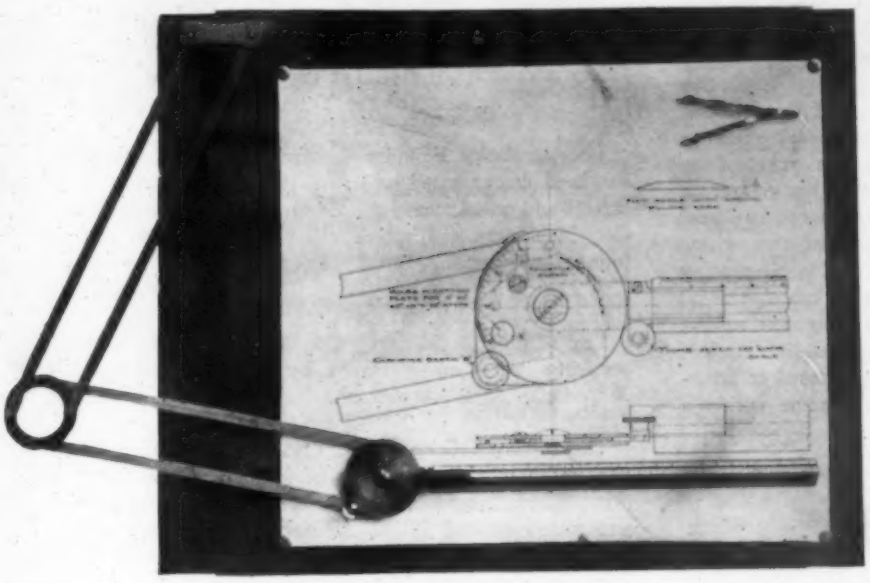


FIG. 1.—THE RAPID SKETCHING DEVICE.

an accurate sketch, as the scale can be used at any desired angle, and the draftsman has the ability to draw a line either in a horizontal or vertical direction without the labor that accompanies the use of setsquares and T-square.

The device as illustrated in Fig. 1 consists of a scale joined to a protractor which is anchored to the upper left hand corner of a board by means of an arm made up of two pivoted parallelograms. It will be seen that the drawing on the board depicts the constructive details of the device while the instrument itself is shown in position ready for work. Fig. 2 shows the device in various positions on the board when drawing various parallel lines, horizontal and vertical as well as the 90-degree range of the scale.

The scale has a free motion of 90 degrees between two stops and it comes against either one or the other, depending upon whether a horizontal or a vertical line is desired. These two stops are fastened to a protractor and may be turned to any angle with the horizontal or the vertical, thus permitting the scale to come against a stop at the desired angle and also at right angles to it. The lower part of the protractor always lies in the same direction no matter where it is moved about the board and hence when the protractor is once set at any desired angle the scale will give parallel lines anywhere on the drawing. This is accomplished by the two parallelograms which act similarly to a parallel ruler.

The protractor may be clamped at any angle by means of the thumb screw B. A spring stop A is provided for the 0, 30, 45, 60 and 90 degree angles, and is operated by merely raising it and allowing it to drop into the appropriate hole for the angle desired. The screw C is for the purpose of adjusting the right angle stops.

The general use of this attachment is exactly the same as one would use a scale without any attachment and either a triangular or a flat scale may be used. The scales chuck readily into place and may be turned so that any edge may be used. The triangular scale has the advantage of giving a greater variety of graduations on one piece, while the flat scale has the advantage of giving a better ruling edge.

The durability of the joints is a very important matter as of course the accuracy of the instruments mainly depends upon the integrity of this feature. The manufacturers have had a goodly share of experience in making these joints for the Universal drafting machine where the conditions are much more severe, and after using a variety of designs have adopted a hardened and ground joint which it is confidently expected will last a life time with the very slight pressure and speed. The pin for the stops is made conical in order to compensate for wear. All parts are finished in dull nickel with the exception of the rods, which are coppered and oxidized. The instrument is well proportioned, nicely finished and has a neat appearance.

The device is intended for boards 19x23 inches for 18x20 inch sketches and the entire outfit of board, instrument and scales is supplied complete or piecemeal by the manufacturers, the Universal Drafting Machine Co., of Cleveland.

J. N. Tata, of Bombay, one of the richest and most influential men in British India, and founder of the house of Tata & Co., who was a recent visitor in Cleveland and other cities of the Central West, sailed for Europe a few days ago, en route for India. Mr. Tata is primarily interested in the project to develop, with the aid of American equipment on an extensive scale, the iron ore resources of the Chanda district, located in the central provinces of India, which, ultimately, he anticipates will render that country independent of outside supplies of rails, etc. An American engineer is to sail early next month for the purpose of making surveys. He will take with him American perfecting equipment, such as drills, etc., and inside of six months work is expected to be started on an American equipped plant, which will be capable, in the first instance, of turning out 300 tons of finished material per day. Mr. Tata expects that considerable of the 36,000 miles of iron rails, which have been in use on Indian railroads for from 60 to 70 years, will be relaid in the near future with steel ones, which will mean the erection of large rail mills. The development of the Chanda iron properties is also expected to lead to the construction of car shops and other large industrial plants, which will entail the purchase of American machinery, etc.

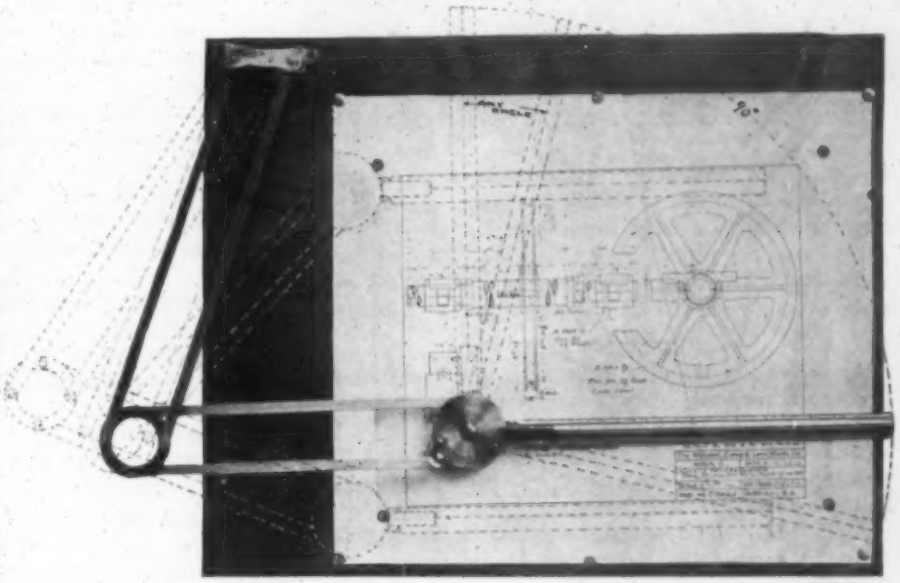
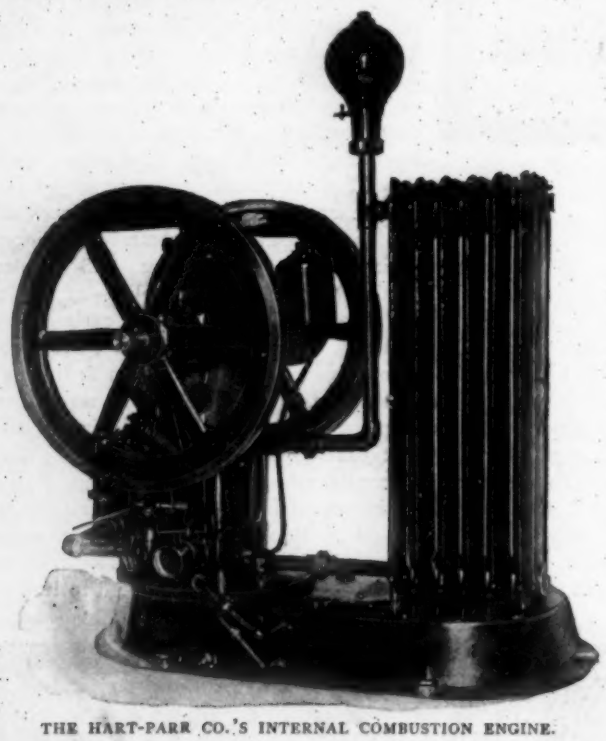


FIG. 2.—THE PARALLEL ACTION OF THE RAPID SKETCHING DEVICE.

The Detroit Shipbuilding Co., Detroit, Mich., is making extensive improvements. A new foundry 75x151 and a machine shop 172x149 feet are under erection. The machine shop will be three stories high.

OIL COOLING DEVICE FOR GASOLINE ENGINES.

Within the past year, the Hart-Parr Co. has erected and equipped at Charles City, Ia., a modern plant for the manufacture of gasoline engines. The use of engines employing gasoline is largely extending throughout the various industries, and in the Northwest they are coming into favor for various agricultural work, such as pumping, milk separating and churning, feed grinding, corn shredding, threshing, and in fact for driving any of the numerous machines which are now placed in the hands of the agriculturist. The feature of the Hart-Parr gasoline engine which has made it particularly adapted for agricultural work is the oil cooling device for keeping within proper bounds the temperature of the cylinder. This takes the place of the usual water cooler and operates by surrounding the cylinder of the engine with a jacket of oil. This is connected to a radiator which spreads this oil over a large surface exposed to the air. The oil absorbs the heat from the cylinder walls and transfers it to the radiator, where this heat is given up to the surrounding air, the oil passing back to the cylinder to receive a new charge of heat. The oil being sealed hermetically within the cooling system is subject to no waste. Those experienced in handling gasoline engines know that a large proportion of the engines exposed to freezing temperatures are severely injured by the same within a



THE HART-PARR CO.'S INTERNAL COMBUSTION ENGINE.

period of two years from their installation. The expense of repairing such breaks is seldom less than several dollars and often amounts to a large item. The Hart-Parr oil cooler is designed to prevent all such troubles and permit the use of the machines at all atmospheric temperatures and with no expense or care necessary to prevent injury by freezing.

As indicating that the railroad labor situation will not become a seriously disturbing factor, the 10 percent advance in wages announced by the Pennsylvania Co. last week is significant. This applies to all employes receiving less than $200 a month and will affect 96,900 men east of Pittsburg and Erie and 35,000 men west of Pittsburg. The amount of the increase is about $6,000,000 a year. The action is one of the strong proofs of the expectation of large interests that the lasting prosperity will be long continued.

The W. G. Duncan Coal Co., Luzerne, Ky., has about 2,000 acres at its present plant and is producing 650 tons of coal per day, mining with the Godman electric mining machines, and is figuring on putting in an electric haulage plant. The company is also negotiating for 5,000 additional acres, on which it expects to make a large opening in the spring of 1903.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in commnnication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The W. R. Oyler Automatic Gas Valve Co. will be incorporated at Akron, O., for the purpose of operating a plant to manufacture an automatic safety gas valve.

The Empire Patent Puddling Furnace Co., of Youngstown, O., has been incorporated under the laws of the state of New Jersey with $125,000 capital to exploit the patent puddling furnace of W. S. Kent, of the Youngstown Iron Sheet & Tube Co.

The Sandusky Foundry & Machine Co., of Sandusky, O., has been incorporated under West Virginia laws with $50,000 capital and will succeed the Co-Operative Foundry & Machine Co. Machinery and pumps will be manufactured and general foundry work will be done. The plant is nearing completion. J. J. Dauch, J. J. Hinde, W. F. Ross, S. Frohman and G. A. Blackford are the incorporators.

The Menough Foundry Co., Wellsville, O., capital $25,000, has been incorporated by G. W. Menough, H. S. Menough, A. G. Menough, E. R. Menough and M. F. Menough.

The Monarch Coupler Co., of Detroit, Mich., has been incorporated with $150,000 capital. W. C. McMillan is chairman; T. H. Simpson, vice president; G. M. Black, secretary and treasurer, and W. C. McMahon, general manager. The coupler manufacturing business of the Michigan Malleable Iron Co. has grown to such proportions that it has become necessary to separate the coupler business from the general malleable casting trade.

John T. Dickson, formerly connected with the Penn Steel Casting Co., and William S. Logan are promoting the organization of a steel casting company at Chester, Pa., to have a capitalization of $250,000.

The Electric Machinery Co., Minneapolis, Minn., recently incorporated with a paid in capital of $110,000, to manufacture electrical machinery and appliances, succeeds the partnership of James T. Boustead and Chas. H. Chalmers, who with W. Lau, are the incorporators. The increase of capital was necessary on account of the large volume of business which was being handled. The firm had a suitable building and the company does not contemplate any extensions at present, but will add about $5,000 worth of machine shop tools, the principal one being a large iron planer. The company is building some fairly heavy electrical machinery. It has seven generators under way at present for direct connection to Corliss engines. Five of these are 150 k. w. running 125 turns and one is 300 k. w. running 100 turns.

The Sandusky Foundry & Machine Co., Sandusky, O., has been incorporated with a capital of $50,000 to do a foundry and machine business.

The Economy Smokeless Furnace Co. has been organized at Portland, Me., with a capital of $50,000 to manufacture furnace stoves.

The Shenango Machine Co., Sharon, Pa., has been incorporated with a capital of $60,000.

The Altoona Foundry & Machine Co., Altoona, Pa., has decided to increase its capital from $35,000 to $100,000.

The American Automatic Switch Co., Waterbury, Conn., has filed a certificate of incorporation. The incorporators are N. B. Coulter, J. W. Maloney and E. W. Wrightman.

The Caldwell Car & Mfg. Co., of Cambridge, O., which was organized July 21, and is now occupying a plant with the Cambridge Foundry Co., will move its entire equipment on Dec. 1 to Caldwell, O., 23 miles south of Cambridge on the Marietta Division of the Pennsylvania Lines and the O. R. & W. R. R., where the company has erected a frame structure 60x225, covered with corrugated iron. A new steam hammer, boring mill, pattern lathes, band saws, engine lathes and general foundry equipment have been added. Up to the present time the company has been manufacturing cars for coal mines only, but will hereafter build tipples, screens, drums, shieves, etc., as well as a general line of industrial cars, including ore cars. The officers of the concern are: Joseph Hartie, president; J. C.

Beggs, treasurer; H. Ashton, secretary and general manager, and F. K. Potter, superintendent. Side tracks are being built from both the above railroads to their plant. The Cambridge Mining Car Co. is out of existence.

The National Loom & Wire Co., Enfield, Conn., has filed articles of incorporation. It has a capital stock of $100,000. Its specialty will be a patented improvement in wire-weaving looms.

The Rockford Well Drill Co., Rockford, Ill., has increased its capital from $10,000 to $20,000.

The Toledo Castings Co. is to be the corporate title of a foundry and machine shop which P. F. Leach and others of Detroit, Mich., will locate at Toledo. The plant is to have a daily capacity of 20 tons and the company will be capitalized at $50,000.

The Girard Foundry & Machine Co., Girard, O., has increased its capital stock from $10,000 to $25,000.

The Neverbreak Shaft End Co., Ltd., of Battle Creek, Mich., has been incorporated with $25,000 capital for the manufacture of a double steel shaft end. John Sigrist is chairman; H. W. Williams, treasurer; G. B. Williams, secretary, and J. B. Williams, manager.

The G. Foster Mfg. Co. has purchased 10 acres at Bettendorf, Ill., upon which will be erected a plant for the manufacture of agricultural implements.

The Keystone Driller Co., of Beaver Falls, Pa., will be in the market for considerable new machinery, in view of its recent fire.

The Hensley Car Coupler Co., of Columbus, O., has been incorporated with $100,000 capital to manufacture a car coupling device patented by W. H. Hensley. W. H. Hensley, G. W. Phillips, H. B. Robinson, G. Hulst and O. T. Roen are the incorporators.

The Burns Boiler & Mfg. Co., of DePere, Wis., has been incorporated with $100,000 capital. W. M. Workman, A. B. Burns, and D. M. Burns are the incorporators.

Fires and Accidents:—

Fire in the works of the Gananoque Spring Axle Co., Gananoque, Can., caused $12,000 damage.

New Construction:

The Penn Gas Coal Co., Irwin, Pa., will erect 50 additional beehive ovens. A new washer is also under erection. The Keystone Coal & Coke Co., at the same place, is sinking a new shaft and expects to have a daily output of 1,000 tons.

The Wilmington Malleable Iron Co., Wilmington, Del., has purchased 45 acres from the Lobdell Car Wheel Co. to be used as a site for an immense malleable foundry.

The Republic Iron & Steel Co. will rebuild the machine shop recently destroyed at Birmingham, Ala. The new shop will be 50x100 feet.

The Michigan Nut & Bolt Works, Detroit, Mich., has purchased the Gaylord Iron Works property for the sum of $40,000. The property is to be used for the erection of additions to the nut and bolt plant.

The S. Morgan Smith Co., York, Pa., will erect a 150-foot addition to its foundry.

It is reported from Johnstown, Pa., that the Cambria Steel Co. has plans prepared for the erection of 960 additional by-product ovens in the near future.

The Great Western Railroad is erecting a 300-foot addition to its boiler shop at Oelwein, near Ft. Dodge, Ia. A coach shop 100x250 feet, cabinet shop 50x100 feet, paint shop 100x170 feet and an addition to the power house 25x60 feet are also under erection.

The American Car & Foundry Co. will erect a paint shop at Berwick, Pa., 800x75 feet.

Douglas G. Flanner, of Toledo, O., and several Bay City, Mich., men have purchased a site in Toledo and will build a boiler works. The specialty will be marine work.

The Toronto Steel & Iron Co. has made a proposition to the city council of Toronto to establish steel works in that city, provided the city will grant exemption from taxes and make other concessions. The company will undertake to manufacture 100 tons per day of flat, round, and square bars, angles, and channels, tie plates, fish plates, angle splices, etc. It promises to expend in building plant and machinery $100,000, and to pay out in wages $60,000 and upwards per year.

Messrs. J. & J. Taylor, Toronto, Canada, contemplate building an extension to their safe works. Land adjoining their property will be purchased from the city.

The Betts Machine Co., Wilmington, Del., is erecting an addition, 240x40 feet, of iron, steel and brick.

F. F. Bartlett and M. M. Bartlett, of South Berwick, Me., are the promoters of a plant to be erected at Matthews, Ind., for the manufacture of edgetools. The capital stock will be $50,000 and the name will be the Matthews Edgetool Works. The plant will start with 100 men under M. M. Bartlett as general manager.

The C. C. Bradley Mfg. Co., Syracuse, N. Y., is to build a plant for the manufacture of agricultural implements. The force of employes will be doubled, making 200 in all. The Syracuse Chilled Plow Co. will occupy the old Bradley plant as an addition to the works.

Chas. A. Stickney, St. Paul, Minn., is erecting a two-story brick machine shop as an addition to his plant.

The A. & F. Brown Co. contemplates making extensive additions to its plant at Elizabeth, N. J.

The Michigan Vapor Stove Co., Grand Rapids, Mich., is building an addition to its plant.

The Johnson Machine Co., with a capital stock of $100,000, has been incorporated in New Jersey to manufacture machinery. The incorporators are: Fred W. Knodel and Clarence E. Sharp, Gibbsborough, N. J., and Charles S. King, No. 305 Market St., Camden, N. J.

The Coplay Mfg. Co., Coplay, Pa., is receiving bids for a new plant at Coplay. The buildings will be as follows: Machine shop, two stories, 40x172 feet; drying house, 270x46 feet; kiln, 240x140 feet; clinker mill, 100x100 feet; stock house, 100x260 feet; crusher mill, 54x54 feet; engine and boiler house, 160x50 feet, and 133x55 feet; coal pocket, 330x50 feet. Electric and steam power plant of about 3,500 h. p. will be installed, using water tube boilers and cross-compound condensing engines. Total cost, $600,000.

Plans have been prepared for the additions to the Calumet shops of the Pullman Co. A car shop of 100x300 feet, and a dry kiln 500x27 feet, are to be built. The work will cost about $60,000.

The Northwestern Steel Co., Seattle, Wash., will erect a rolling mill. It is to be equipped with 9, 12 and 16-inch rollers. The machinery has been ordered, and work on the plant will soon commence.

The Herzog Iron Co., of Minneapolis, Minn., has decided to erect a foundry at a cost of $15,000. The building will be 160x80 feet.

The Ingersoll-Sergent Drill Co., of New York, will erect a new foundry and machine shop at Phillipsburg, N. J. The machine shop will be 100x260 feet, and the foundry 150x500 feet.

The Pittsburg District:—

The statement made in our last issue that Hyde Bros. & Co., of Pittsburg, incorporators of the Clearfield Iron & Steel Co., are dismantling the plant formerly operated by the Richmond Iron & Spike Co., at Iron Gate, Va., and that the machinery is being removed to the new plant of the Clearfield Iron & Steel Co. at Clearfield, Pa., was not correct as to the disposition of the equipment. The greater part of the machinery from Iron Gate is either being scrapped or shipped to Pittsburg and sold there. A small proportion only, of the best parts, has been shipped to Clearfield, together with some scrap to be used up as scrap when the mill is put in operation. Practically everything at Clearfield will be new. The Lewis Foundry & Machine Co. is building a 22-inch puddle mill and a 60-inch squeezer for the Clearfield Co., and the United Engineering Co. is building an 18-inch mill complete with tables, etc., and also a 14-inch mill. The buildings, which are of steel throughout and cover over 70,000 square feet of surface, are being erected by the Fort Pitt Bridge Co., and the boilers and stacks are being built by the Du Bois Iron Works, Du Bois, Pa.

The Pittsburg & Buffalo Co., Pittsburg, has purchased 3,500 acres of land in Washington, Green and Armstrong Counties, Pa., and will immediately begin its development.

In Armstrong County a shaft is to be sunk immediately which will yield 150 tons daily. The offices of the company have been removed from the Park Building to the Frick Building.

During the month of October 29,056 tons of finished material was produced at the Glassport, Pa., plant of the Pittsburg Steel Co., breaking the best previous record of 28,018 tons.

The new plant of the Sterling Steel Foundry Co., Braddock, Pa., was placed in operation last week. A specialty will be made of draw heads and other railroad work and general castings will also be made. The general office of the company is in the Frick Building, Pittsburg.

The Scully Belting & Supply Co., of Pittsburg, has gone into voluntary bankruptcy. Too keen competition is assigned as the cause of the failure. The company dealt in belting, packing, etc.

The Livengood Coal & Coke Co., of Pittsburg, has been incorporated with a nominal capitalization for the purpose of developing 10,000 acres of coal land in West Va. Plans are being made for sinking shafts that will produce 5,000 tons of coal daily and 500 coke ovens are to be erected. The officers of the company are as follows: S. D. Livengood, president; Charles Lang, vice president; H. Lorentz, treasurer; F. X. Weixel, secretary.

The Pittsburg Mfg. & Supply Co., of Pittsburg, has purchased the Center Foundry at Wheeling, W. Va. The price paid for the plant was $37,000. Gas engines are to be built.

The Bessemer & Lake Erie Railroad, owned by the United States Steel Corporation, will be double tracked its entire length. The cost of the improvements is estimated at $2,000,000. At present the road is double tracked only 23 miles of its length.

The Masontown Coal & Coke Co., of Uniontown, Pa., has been incorporated with $200,000 capital. William A. Stone, I. H. Brownfield, George Whyel, Harry Whyel and G. H. Burchinal are the incorporators.

General Industrial Notes:—

The razing of the plant of the old Pomeroy Iron & Steel Co., Pomeroy, O., has been finished by direction of the American Steel Hoop Co., the present owner.

The Mathy Co., Washington, D. C., recently incorporated with a capital of $16,000, was formed by Mr. Joseph Mathy and four of his former employes, three of whom had been associated with him for more than ten years. All are experts. The company will manufacture furnaces, ranges and sheet metal goods.

The Blaisdell Screen Plate Co., Oakland, Maine, recently incorporated with a capital of $100,000, to manufacture screen plates for paper and pulp mills, has its plant at Oakland built and equipped. The start was made Monday, Nov. 24.

The new rail mill of the Tennessee Coal, Iron & Railroad Co., Ensley, Ala., was successfully placed in operation last week. For a time the plant will operate on rails for the company's railroad after which the product will be placed on the market. The mill is designed to roll 1,000 tons daily, but it will probably be some time before this output is reached.

The plant of the Greensburg Foundry & Machine Co., Greensburg, Pa., is to be removed to Jeanette, Pa., within a month. A site of 13 acres has been acquired at Jeanette and work on the erection of the foundry and machine shop is already well under way.

The Valley Iron Co., Valley Head, Ala., has placed a contract with R. A. Patten & Co., of South Pittsburg, Tenn., for the erection of 300 bee hive coke ovens.

The Toledo Machine & Tool Co., of Toledo, O., has purchased an additional 125-h. p. engine and will add a new department, equipped with lathes, planers, radials, shapers and other tools. The company has just purchased an 84-inch iron planer with four heads. The proposal to increase the capital stock to $250,000 is under consideration.

During the month of October the output of the five Ensley, Ala., furnaces of the Tennessee Coal, Iron & Railroad Co. amounted to 20,800 tons.

The old Riverside plant of the American Tin Plate Co., at Cullom Station, just below Cincinnati, O., has been sold to the Cincinnati Equipment Co. The American Tin Plate Co. dismantled this plant several years ago. The buildings and real estate were sold for $11,000. The Cincinnati Equipment Co. was incorporated recently with a capital of $15,000. The company will equip the plant for building and repairing locomotives and other railroad rolling stock, and will manufacture railroad supplies. About $75,000 will be spent in equipment for the plant. The officers of the company are Isaac Joseph, president; Morris Joseph, vice president; W. M. Warner, secretary and treasurer.

The new plant of the American Tube & Stamping Co., Bridgeport, Conn., will probably be placed in operation next May. The plant will contain a number of open-hearth furnaces and a blooming mill. The building that will contain this mill and steel plant will be 608 feet long and 110 feet wide. The steel work of the buiding is partially completed and would have been entirely completed some months ago but for the inability of the contractors to secure proper shipments of structural steel. The steam plant consisting of ten boilers is already in place awaiting operation.

Work on the erection of the new plant of the Lebanon Valley Iron Co., at Hebron, near Lebanon, Pa., is progressing favorably. The plant was formerly situated at Norristown, Pa., where it was known as the Norristown Iron Co. Some of the machinery of the old plant has been installed in the new mill. The main building is 423 feet long and 117 feet wide. It will contain a 20-inch muck mill and eight puddling furnaces, an increase of three over the old plant. The material will be rolled on two combination 16 and 10-inch finishing mills and a 7-inch mill is also being installed. A machine shop 80x30 feet is also being erected. The capital stock is $300,000, consisting of $150,000 of 7 percent cumulative preferred stock and $150,000 common stock. The officers are: Harry H. Light, president; Simon P. Light, treasurer, of that city, and William S. Davis, of Reading, secretary. The directors are: Harry H. Light, Simon P. Light, Samuel L. Light, Eli Attwood, J. Warren Light, all of Lebanon, Pa., and William S. Davis and W. W. Light, of Reading.

Work on the erection of the new pipe mill of the Susquehanna Iron & Steel Co., Columbia, Pa., is progressing favorably. The threading department is already under roof and considerable machinery has been installed. The Forter-Miller Engineering Co., of Pittsburg, has the contract for erecting the four furnaces and the foundations are already complete. Two 90 and two 70-foot stacks for these furnaces are being erected by James Lappay & Sons, of Pittsburg, Pa.

The Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., resumed operations last week, after being idle for several weeks on account of the shortage of iron.

In a circular letter to stockholders of the Colorado Fuel & Iron Co., requesting their proxies at the annual meeting to be held on Dec. 10, at Denver, Col., President J. S. Osgood shows that the net earnings from June 30 to Oct. 31, 1902, were $747,341, while for the same period last year they were $413,011, or an increase of $334,330, which is about 85 percent. He estimates that the company will earn this year $1,600,000, sufficient to pay the interest and a dividend on the preferred stock of $1,300,000, 7 percent on the common stock of $1,688,000, leaving a surplus for depreciation and sinking fund of $620,000.

The Indianapolis Foundry Co., Indianapolis, Ind., has completed two additions to its foundry each 100 and 150 by 40 and 50 feet respectively.

Contracts for the erection of eight state bridges were awarded by the public works department of the State of Pennsylvania last week, as follows: Penn Bridge Co., Beaver Falls, bridge over Big Esquimunk creek, Wayne county, $34,889, and bridge over Sinking creek, Centre county, $6,847; W. H. Gulick, Phoenixville, bridge over Wallenpanyunk creek, Wayne county, $16,850; York Bridge Co., bridge over Wallenpanyunk creek, $21,987; National Bridge Co., Pittsburg, bridge over Larry creek, Lycoming county, $17,900; King Bridge Co., Cleveland, Nuss bridge, Columbia county, $22,750; Nelson & Buchanan, Chambersburg, bridge over Juniata river, Millerstown, Perry county, $144,680.

The Guthrie Foundry & Machine Co., of Guthrie, O. T., has been purchased by F. C. Damm, and the name of the plant will be changed to the Oklahoma Iron Works. A company to control the property will be capitalized with $25,000 capital and extensive additions are planned.

ECONOMIES OF ELECTRICITY IN THE SHOP.

L. R. Pomeroy, of New York, special representative of the railroad department of the General Electric Co., read a paper on the electric driving of machinery in railroad shops before the Central Railway Club ,at Buffalo, Nov. 14. The following are extracts from the address:

"The Baldwin Locomotive Works claim that the introduction of electricity made a direct saving of 20 percent in the pay rolls and 40 percent in shop area. The introduction of cranes, made possible by the introduction of electricity, enables the reduction of the laboring force by one-tenth of that previously employed.

"The advantages of cranes are a legitimate claim in favor of electricity, for the reason that expeditious and efficient cranes are impossible without electricity. It has been stated that it takes eight men four hours (at a cost of $5.14) to lift a 10-wheel locomotive, weighing 132,000 pounds, off the drives, with screw jacks; four men one hour, with pneumatic jacks; with an electric crane, 10 minutes.

"It has been proved over and over again, that the employment of electricity for operating railroad shops increases the output per day, per man, per machine, per square foot of floor space; increasing the quantity and enhancing the quality of the product, while decreasing the cost.

"Electric shop driving permits of a centralized power generation for light and manufacturing purposes; maximum efficiency of workmen, machines and labor involved; intensified production at best speeds and at the power limit of machines, with improved quality, maximum output and reduced cost. The cost of maintenance is a minimum. The depreciation is less than in any other system. The saving effected is much more than sufficient to pay all the incidental repairs and renewals to the electric machinery or the wiring system. Attendance and supervision can be largely centralized and reduced to a minimum.

"Electric generators and motors are the simplest types of motive power machinery that can be used in the development of the power transmission for manufacturing work. They have the fewest parts requiring renewals. They require practically no repairs. The arragement of the tools themselves is not dependent upon the location of the transmission lines, but can be placed independent of all such conditions and arranged solely with reference to the work to be performed; the systematic and economical movement of the raw materials and the finished product through the shop and at required delivery points. Permanent additions to the electric generating plant and the distributing system are made with a gradual and pro rata outlay of capital, instead of in disproportionate blocks of new equipment as required by mechanical transmission.

"Advantages of individual drive are that the workman has the most perfect control of all the factors entering into the economies of production. The productive efficiency of the machine is increased. It may be operated at all times up to the power limit, reducing time and cost of labor for any given product. The choice of the individual drive, however, depends upon the power required, the size of the machine, the time it is in service and the value of the product. In group driving, a few large motors are employed independently, driving sections of shafting of most economical length. This method is thus adapted for driving a number of small machines, with no particular requirements in speed or power; or for most economical manufacturing along special lines of independent driving of separate floors, departments or detached buildings. The most generous requirements of factory transmission can be met by an intelligent combination of group and individual driving.

"As to the necessity of variable speed in a railroad shop, or rather how much or how far it is desirable to go in this regard is a mooted question. My experience has been that not over 30 percent of the tools in such a shop require it, and very seldom is it necessary to change the speed after the work is set in the machine. Consequently, very little electric speed variation will meet most requirements. Ordinarily, when the workman has properly fixed the work in the machine, he can readily change the belt to the proper cone or gear, that gives the desired speed.

"Again, with a motor with slight variation in field winding, increasing the cost of the motor only about 5 percent over standard types or constant speed motors an increase in speed of 25 percent above normal may be obtained by field weakening; or 40 percent below normal by interposing armature resistance is possible.

"While it is obviously not advisable to presume on using the full range of such speed variation continuously, yet in conjunction with the step cones, or back gears, any intermediate speed between the cones or gears can be exactly met by the introduction of a very slight amount of resistence or electric regulation, and under such conditions such speed variation is feasible and practical. This represents the cheapest form of utilizing motor speed variation, from the viewpoint of first cost. Next in point of cost is the use of a special type of motor, giving 100 percent field regulation. By this type of motor the varying requirements of most any tool can be met at a slightly increased cost over constant speed or standard motors. This is a rational method of meeting the case, as the range of speed is liberal, and the cost therefore moderate.

"By varying the current flowing in the field coils of a motor the strength of the magnetic field is changed and the speed of the motor varied. With any setting of the field the motor will give constant speed under changes of load, and this method, therefore, avoids the greatest objection to rheostatic control.

"A motor of ordinary design will not permit of any considerable field weakening, without deleterious sparking at the commutator, but with a special motor having small armature reaction a variation in speed of two to one can readily be obtained, and when delivering a constant horse power the current will be approximately the same at all speeds because the potential across the armature terminals is always the same. As the field current of a motor is only a small fraction of the total current the efficiency of this method of control is practically the same at minimum and maximum speeds and allows the use of a much smaller controller and renders it possible to get a greater number of running speeds than can be economically arranged for with any other control. With the three-wire multiple voltage system, and a motor arranged for 100 percent field control, a variation of four to one can be given, but the cost will be in the neighborhood of 150 percent greater than the standard constant speed motor, while with the four-wire multiple voltage scheme a speed of about seven to one is possible, but the cost will be about 250 percent greater than the standard motor. In the latter case a 9-h. p. motor is required to furnish a maximum power of two horse power, through a range of speed from 164 to 1,200 r. p. m.

"There is a rapidly growing sentiment in favor of the use of alternating current apparatus, as this type has many valid claims over direct-current machines, and the rapid introduction of practical mechanical variable speed mechanism or the use of magnetic clutch speed changes makes the induction motor as flexible and available for variable speed as the direct current motor. Ordinarily, the special layout of the shop plant, the distance the power has to be transmitted, lighting of stations, freighthouses and remote buildings, generally determines whether direct current or alternating current shall be used.

"In general, electricity is transmitted by a current under pressure. This has many close analogies to the transmitting of energy from a pump to a water motor by the flow of water through pipes. The amount of power delivered depends upon the quantity of flow and upon the intensity of the pressure. In electrical units, 100 amperes of current at 1,000 volts pressure are equivalent to 1,000 amperes at 100 volts. An electric current in passing through a wire loses a portion of its energy in the same way that water loses head by friction.

"This loss in an electric system is an invariable quantity for any given amount of current through any given conductor length and size, and does not vary with the pressure and velocity of flow as is the case with ponderable fluids.

Increasing the pressure or size of the conductor will result in an increase in actual amount of power delivered without an increase in actual amount of friction loss. If a wire of certain size will carry 100 amperes a given distance, with a loss or drop in pressure of 50 volts, or 5 percent of 1,000 volts, then 10 such wires will be required to carry 1,000 amperes with a loss of 50 volts. But 50 volts is 50 percent of 100 volts; and in order to make the loss the same as in the first case the cross-section of the wire must be increased 10-fold, so that 100 times as much copper is required for delivering power at 100 volts as is required at 1,000 volts. If the pressure is increased to 10,000 volts, the size of the wire required is 1 percent of that necessary for 1,000 volts, and is but 1-10,000 part of that demanded by a 100-volt current.

"The ideal system must transmit current at high pressure and use it at low pressure; it must transmit the 10 amperes at 10,000 volts and, for example, transform it into 1,000 amperes at 100 volts. There is no apparatus for effectively transforming direct current from high to low pressure, while the alternating current is readily and simply transformed. It is this characteristic that has given the alternating current its great commercial success. The description of the induction motor is negative; no commutator, no collector rings, no brushes, nothing to handle but the switch, nothing to wear but self-oiled bearings, no exposed parts, no danger from fire; the machine composed of a rotor and a stator."

ANOTHER FOUNDRY "REVOLUTION."

Anouncement was made recently of the intended incorporation in New Jersey of the International Foundry Co. with a capital of $5,000,000, Claude L. Stillman and Frederick Parsons incorporators. The company is to exploit Chas. Sp. Szekely's system of casting iron, which was referred to in *The Iron Trade Review* of July 24, 1902. What this process is is explained in part by the following extract from the company's prospectus:

"At the present time iron is cast in sand molds, molders being engaged in making the molds which can only be used for one casting. In all foundries the molders are engaged the better part of the day in preparing the sand form or mold for the particular article desired to be cast, and later in the afternoon the iron is smelted (sic) and cast. A liberal time is allowed for the molten metal to remain in the sand mold to cool, and usually the next morning the castings are taken from the molds. Then follows the process of cleaning the article which has been cast the day before. This means an enormous expense, as the wages of molders vary from $3 to $4.50 a day. Under the system invented by Mr. Szekely permanent molds are used. The mold is made for the particular article desired to be cast and the result is that the casting is done day and night, if necessary. The molten iron is poured into the permanent mold, opened, and practically a finished article is taken therefrom within 30 seconds after the casting. The mold is again closed and another casting is made, and this can be continued ad infinitum with the same rapidity.

"The Szekely process consists of a patent mold and a chemical compound used in smearing the molds, which enable us to produce iron which can be bored, chiseled, rimmed, drilled and planed with greater ease than can now be accomplished with sand castings, and enable us to produce a quality of iron which experts liken to soft steel. It can readily be understood that there is a tremendous saving under this process, as the cost of molding, cleaning, and the sand or graphite, as now used, are done away with. At the present time this system is unknown to the iron world, and the right to use the same has been purchased by the International Foundry Co. at an enormous cost and the commercial utility of the process has been absolutely demonstrated after the expenditure of many thousands of dollars. It is apparent that this system is particularly adapted to articles manufactured in tremendous quantities where the patterns are similar. It is the intention of the International Foundry Co. to manufacture brake shoes at the commencement, as this article is used by millions of tons in the United States alone. While at first blush it may appear that the brake shoe is a very ordinary casting yet it is a fact that it must meet certain requirements in order that it may be satisfactory to the various railway companies. In 1894 the Master Car Builders' Association of the United States laid down a set of rules concerning the requirements of a brake shoe, and unless a brake shoe comes up to these particular requirements it is not acceptable to any of the railroad companies.

"The Purdue University of Lafayette, Ind., which contains the finest locomotive laboratory in the United States, was particularly designated as the authority for the making of tests of brake shoes. The Szekely brake shoe has been tested by this university, and its report is herewith appended, together with a letter from Mr. W. A. Warman, assistant engineer of the American Tobacco Works, in a measure explaining such report to those who are not familiar with the technical terms used therein. From this report it will be seen that under the Szekely process the brake shoe manufactured not alone comes within the rules prescribed by the Master Car Builders' Association, but is in fact one of the finest brake shoes, if not the finest, manufactured in the United States. This report was obtained at the request of the Pennsylvania Railroad Co. and the New Jersey Central Railroad, which at the outset refused to even entertain the proposition of allowing our brake shoe to be tested on their roads unless a report of this nature was furnished. The tremendous import of this report can hardly be understood by those not familiar with the brake shoe industry," etc., etc.

The remainder of the prospectus is given up to a glowing statement of the condition of the brake shoe business and its opportunities for profit.

New York papers of recent date note that Claude L. Stillman, secretary of the Murphy Varnish Works, Newark, N. J., the chief promoter of the International Foundry Co., was arrested in Newark on a charge of embezzling $40,000 from the Murphy Varnish Co. In the same connection it is stated that the incorporation papers of the International Foundry Co. have not been filed, Stillman having been arrested before this step could be taken. Stock of the company has been issued, however, a dispatch from San Francisco stating that Mrs. Millie Freud, a resident of that city, had sued to recover $7,500 which she says she invested in the stock of the corporation. Col. H. J. Kowalsky, of San Francisco, against whom the suit is directed, says that he and Stillman together hold 1,400 shares of the company.

At Roanoke, Va., a charter has been granted to the West End Iron Furnace Co., whose capital stock is $500,000. It will operate blast furnaces rolling mills and forge. The plant is in Roanoke and was formerly operated by the Virginia Iron, Coal & Coke Co. The following officers have been elected: President, H. T. Deckhert, Philadelphia; secretary and treasurer, Donald McLeod, Rutledge, Pa.; directors, T. D. Richardson, Philadelphia; J. F. Sener, Lancaster, Pa.; R. G. Stewart, Philadelphia, and C. C. Norris, Philadelphia.

Arrangements have nearly been completed for starting up the Peninsular and Detroit furnaces at Detroit. The furnaces are now the property of the Wayne Furnace Co., recently organized by Joseph H. Berry and other Detroit capitalists. About 18,000 tons of ore has been brought down by the new company for use this winter and it is expected that much more will be shipped before navigation closes. Charcoal iron will be manufactured.

The Central City Foundry Co., Huntington, W. Va., whose plant was recently destroyed by fire, will not rebuild before spring and has not decided exactly what kind of building will be erected.

Coal mining operations in southwestern Pennsylvania have been increasing at such a rate within the past year that Chief Inspector of Mines Roderick has found it necessary to create three new bituminous districts.